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PRINCIPAL CONTENTS.

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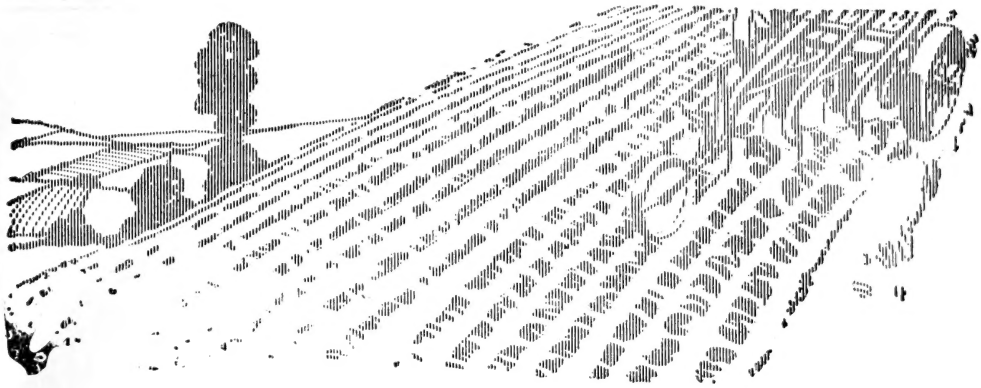

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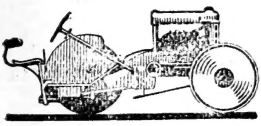

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MINISTRY OF AGRICULTURE AND FISHERIES.

ORMSKIRK POTATO TRIALS.

ANNUAL REPORT FOR 1919 OF THE TRIALS OF VARIETIES OF POTATOES IMMUNE FROM WART DISEASE.

SUMMARY OF CONTENTS.

Copies of this publication may be obtained from the Offices of the Ministry. 3, St. James's Square, London, S.W.1. Price 1s. 6d. net, post free.

CONTENTS.

THE JOURNAL
OF THE
MINISTRY OF AGRICULTURE

Vol. XXVII. No. 9.

DECEMBER, 1920.

NOTES FOR THE MONTH.

The Minister's Speech at Leicester.

In consequence of repeated applications from agriculturists throughout the country for a verbatim report of the Minister's Speech at Leicester, on 16th October, the Speech is printed *in extenso* on pp. 816 to 830. Reprints are available free of charge on application to the Ministry's Office, 3, St. James's Square, London, S.W.1.

* * * * * *

The Formation of County Agricultural Committees.

On 23rd December last, Royal Assent was given to the Ministry of Agriculture and Fisheries Act, 1919,* a measure framed to reorganise, on more efficient and uniform lines, the machinery for dealing with agricultural matters. The first and second parts of the Act provide for the substitution of a Ministry in place of the Board of Agriculture and Fisheries, and for the establishment of Councils of Agriculture for England and Wales, as well as an Agricultural Advisory Committee.

It is with Part III of the Act that this note is concerned. This Part requires that every County Council shall establish an Agricultural Committee, of which not less than two-thirds of the members are to be appointed by the County Council, although they need not all be members of the Council, the remainder being appointed by the Minister. In practice, the majority of Councils have accepted a suggestion made by the Ministry that a proportion of the members to be appointed

*Notes explaining the main provisions of this Act appeared in this *Journal*, January, 1920, p. 962, and February, 1920, p. 1129.

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by the County Council should be selected from among the nominees of agricultural organisations having branches in the county.

It should be emphasised that the Act is not concerned with agricultural policy, nor is it designed to supersede any Committee of the County Council previously dealing with a particular branch of agricultural administration. Its intention is to co-ordinate existing Committees, to fit them into a general scheme, and to bring within the purview of a single Committee, assisted by a number of Sub-Committees, all the numerous powers and duties of the County Council relating to agriculture; thus affording that industry in each county a position appropriate to its importance.

The wide scope of these Committees may be judged from the fact that they will, as a general rule, administer, either directly or through the medium of Sub-Committees, the Small Holdings and Allotments Acts, the Diseases of Animals Acts, the Destructive Insects and Pests Acts, the Fertilisers and Feeding Stuffs Act, Part I of the Land Drainage Act, 1918, and the Rats and Mice (Destruction) Act. In addition, most, if not all, will have delegated to them the Minister's powers under Regulation 2M of the Defence of the Realm Regulations relating to the increase of food production, and, on the expiration of those powers, the similar powers conferred by Part IV of the Corn Production Act, 1917, as well as the powers under Part II of the Land Drainage Act, 1918. They will become responsible for the work of the existing County Live Stock and Horse-breeding Committees, and will, in some instances, supervise agricultural education in the county. Besides undertaking the administration of these important enactments, Agricultural Committees will include among their duties the task of fostering rural industries and initiating schemes for the general enrichment of social life throughout the countryside.

The first step towards setting up the Committees has been the preparation by each County Council of a Scheme for the establishment of the Committee, which was subject to approval by the Minister. In order to assist Councils in this respect the Ministry formulated a Model Scheme, and it is gratifying to observe that almost every County Council has adopted the general provisions of the Model, with such minor modifications as were found expedient to meet the peculiarities of the county. The last of the Schemes to be submitted to the Ministry received final approval early in September.

Considerable progress has been made in setting up the Committees, and also the Sub-Committees which are to be responsible for the detailed work of administration. At the end of October, in 54 out of the 62 administrative counties in England and Wales (excluding London, where it has been decided not to establish a Committee, but including the Isles of Scilly) one or more meetings of the Committee had been held. In all other cases the Committees are now complete, and the first meeting will shortly be held.

Even when a Committee is complete it is still necessary for much to be done in the formation of Sub-Committees, some of which have to carry out the duties of existing Committees with statutory powers. It is, however, confidently expected that, before the end of the year, every county will have its new organisation in full working order.

* * * * * *

The Reclamation of Waste Land by Agricultural Means.

The reclamation of waste land was the subject of an address delivered by Dr. E. J. Russell, the Director of the Rothamsted Experimental Station, on 5th November, to a meeting of the Association of Economic Biologists. The speaker first made brief reference to cases in which the problem was mainly an engineering one, namely, on land which was inaccessible either owing to the absence of roads or to the soil being so wet that implements and animals could not be got on to it. Reclamation in such cases is a question of the provision of good roads and of proper drainage. An instance mentioned was the area between the rivers Crouch and Blackwater in Essex. The neighbouring island of Foulness has been reclaimed by building a wall to prevent floods and by drainage, and is now valuable agricultural land.

In some cases the land is waste through some inherent defect, *e.g.*, thinness of soil with an underlying stratum of rock. If this stratum is thin and there is a good soil underneath, the problem is to remove the rock and join up the two sections of good soil. When, however, the rock underneath the thin soil is solid rock, there is no practical means of solving the problem.

In dealing with the question of reclamation by purely agricultural means, Dr. Russell divided the requirements of plants and soil organisms into five categories, namely: (1) Nutritive materials and energy supply; (2) Air; (3) Water; (4) Suitable temperature; (5) Absence of injurious conditions.

The problems of reclamation presented by categories 2, 3 and 4 are the same in practice, so that there are really only three factors which need to be considered, and since the absence of nutritive materials (category 1) can be remedied by the use of artificial fertilisers, the number is still further reduced to two, namely, water supply and injurious conditions.

The speaker took as a datum rainfall line the 30-in. rainfall line from Northumberland to the Isle of Wight. He stated that the waste land problem east of this line is largely due to deficient water supply, and to the west frequently to the presence of harmful substances, particularly acid peat. The problem in the former area is solved by bridging the gap between soil conditions and crop, namely, by growing special crops and by altering soil conditions to suit the desired crops.

The constituents of cultivated land which fall to be considered in examining agricultural methods of reclamation are sand, silt, clay, organic matter and calcium carbonate. Land may be waste through excess of sand, clay, or organic matter, or through acidity. Some constituents, as, for example, organic matter, may be lacking, and the method then adopted is to grow and plough in green crops such as red clover, &c.

Examinations of waste areas are carried out by comparing the mechanical analysis of the soil of waste land with that of adjoining poor land, and also of adjoining better agricultural land. Such an analysis reveals the factors which are in excess or otherwise on the waste land as compared with the agricultural land.

Sandy Soils.—Dr. Russell first dealt with soils on which there is a large excess of sand, *e.g.*, on the Lower Greensand and the Bagshot sands in Surrey. The higher land in such cases is usually too dry and the lower too wet, with the result that ripening of cereals is hastened on the high land and retarded on the low, and unevenness in crop occurs. Where the slope is a long and gradual one, however, more uniform conditions over a larger area are obtained, and the land can be cultivated; here the underground drift of water makes the conditions much better. The remedy adopted abroad in the case of dry sands is irrigation, but this is not possible in this country, and the problem has therefore been approached by attempting to diminish the loss of water due to evaporation and to soaking into the sub-soil.

The method adopted is to increase the colloidal properties of the soil by adding either clay or decomposing cellulose.

Claying was formerly used a great deal, but at the present time the method is too expensive, as about 50 tons to the acre would be required. The practice followed, therefore, is to increase the organic matter. One method is to add farmyard manure, as is done by the market gardeners in the Biggleswade district. Crops are sold in the towns, and stable manure is carried back from the towns to the market gardens and dug in the sandy soil. Land which would otherwise be poor is thus made to produce heavy crops. The method is only feasible in the case of market gardens, and is too expensive for ordinary agricultural adoption.

The agricultural method is to run sheep over crops of swedes, rape and vetches, the sheep being confined within hurdles. In this case the expense of cartage is avoided, since there is no need to carry the manure to the soil. The Lower Greensand in Surrey and Sussex and other parts have been improved in this way. The practice is carried out in winter, because the soil may be too hot for the sheep in summer.

A further agricultural practice in reclaiming waste sand is that of green manuring; lucerne, vetches, lupins, &c., are grown and ploughed in, either whole or with the tops previously cut off, and used for stock feeding. This method has been adopted at both Woburn and Rothamsted, but it has the disadvantage that if the whole of the green crop is ploughed in no money return is obtained for that season. The practice, therefore, usually resolves itself into the top being cut or fed and the rest ploughed in. This means, of course, that the process of reclamation is much slower. The making of the crop into silage prevents any waste in its use for feeding to animals. A mixture much in vogue is oats and tares. The first crop on waste land may be low, but as the process is repeated in successive years with a suitable fertiliser scheme, the improvement becomes more and more marked. Suitable crops to follow the green manuring are potatoes, carrots, barley, rye, kidney vetch and lucerne.

Chalky Soils.—The soil collects in the bottom land, but becomes thin on the higher land. The method adopted is to cultivate the lower parts of such areas and to improve the herbage on the higher land by the use of basic slag.

Clay Soils.—Rain makes such soils nearly impassable for horses and implements, which in some cases can only be usefully employed on the land for about 50 days in the year. Formerly,

the practice was to employ a large number of teams to perform the ploughing in the short time available, but the introduction of the tractor has helped considerably in solving the problem of the reclamation of clay lands.

The addition of chalk deflocculates clay, *i.e.*, changes it from a sticky to a more permeable condition. The best crops for poor clays are wheat, beans, mangolds, kohl rabi (but not swedes) and grass. Of these, the best is grass, but wheat does well.

Peaty Soils.—Dr. Russell also dealt with the reclamation of peaty soils. No account of this part of his address is given here, as it is hoped to publish an article on this question shortly.

* * * * * *

Cumberland and Westmorland as Nurseries for Seed Potatoes.

OWING to the conditions prevailing in the counties of Cumberland and Westmorland, there is at present an excellent opportunity for these two counties to develop into a first-class district for the production of seed potatoes. Undoubtedly a large acreage in both counties is suitable for the cultivation of potatoes, and the seed which has been raised in them has produced excellent crops elsewhere in the country. The operation of the present higher charges for the railway carriage of seed will assist a development in this direction by inducing growers in the South to seek nearer sources of seed than those on which they have been accustomed to rely.

Immune Varieties.—Farmers who intend to take advantage of this opportunity should remember that in the near future the demand for "seed" will tend to become restricted to those varieties of potato which are immune from wart disease. They should bear in mind, also, that the present high cost of crop production will further restrict this demand to the best and purest stocks of seed only. It is important, therefore, that farmers in the counties of Cumberland and Westmorland should take advantage of the Ministry's Scheme for the inspection and certification of crops.

The Certification of Crops.—Applications for the inspection of growing crops of immune varieties of potato should reach the Ministry before the 1st July. Crops which, on inspection, are found true to type and free from admixture of "rogues," will be certified as such and given a serial number which

should be quoted to purchasers, in order that they may be assured of the purity of the stock they are purchasing.

The best immune varieties are:—

First Early.—Immune Ashleaf, Dargill Early, Resistant Snowdrop or Witch-Hill, America, Arran Rose;

Second Early.—Great Scot, King George, The Ally, Nithsdale;

Main Crop.—Kerr's Pink, Majestic, Tinwald Perfection, Irish Chieftain and Rhoderic Dhu.

The following additional information as to the regulations of the Ministry with regard to Infected Areas under the Wart Disease Order of 1919 may be useful.

The Policy relating to the Planting of First Early Varieties in Wart Disease Infected Areas.—Owing to present lack of suitable first early varieties immune from wart disease, the Ministry does not, for the time being, propose to restrict the planting of first early varieties in Infected Areas to those which are immune, and has made the following concession:—

On land situated within an Infected Area, but on which disease has not actually occurred, occupiers may plant the following first early varieties:—

Duke of York (or Midlothian Early or Victory); May Queen; Ninety-fold; Epicure; Sharpe's Express; Ringleader; Eclipse; Sir John Llewellyn; and Puritan; and any others that may be hereafter approved by the Ministry for the purpose.

If "seed" for this purpose is required to be *introduced* into an Infected Area, a licence from the Ministry will be necessary.

This policy will remain firm until May, 1924. All potatoes grown under this concession must be used or consumed within Infected Areas.

The Wart Disease Order.—The main requirements of this Order are as follows:—

(1) If disease appears, or re-appears, on any land, or is found in potatoes in any kind of store, the occupier of the land or the owner of potatoes must at once notify the Ministry.

(2) Only seed of immune varieties, certified as such by the Ministry, or otherwise specially licensed by the Ministry, must be planted in an Infected Area, or brought into an Infected Area for planting (except the variation referred to above as to First Early varieties).

(3) Seed raised in an Infected Area must not be sold for planting in land which is not within an Infected Area.

(4) Tubers visibly affected with wart disease must not be sold or offered for sale for any purpose.

A fine of £10 may be inflicted for each and every contravention of any of the regulations mentioned above.

Copies of the Wart Disease of Potatoes Order of 1919, Leaflet No. 105 on Wart Disease, and a Map showing the distribution of Infected Areas in Scotland (see p. 891), may be obtained on application to the Ministry.

* * * * * *

The Purchase of Seeds.

UNDER the Testing of Seeds Order, 1918, it is necessary, in the case of a sale of any of the principal farm or garden seeds, for the seller to declare to the purchaser certain particulars with regard to the quality of the seed, the percentage of germination, percentage of purity, presence of injurious weeds, &c.

Farmers, gardeners, allotment holders and others should be careful to ensure that this declaration is made to them in the proper manner, and if the seedsman from whom they purchase their seeds fails to meet his obligations in this respect the matter should at once be brought to the notice of the Ministry. The use of good seed with a high germination and free from impurities, particularly of noxious weed seed, is essential for high crop production. Cheap, low-quality seed is wasteful and uneconomical, while the sowing of lots of seed infested with noxious weeds will naturally mean extra work in the eradication of weeds.

There is now no reason why a farmer should *unknowingly* purchase such low grade seed. If he does he has himself only to blame, as the seedsman is required by law to disclose all the essential particulars as to the quality of the seeds he sells.

If a farmer suspects that a parcel of seeds is not up to the standard guaranteed by the seedsman he should forward a sample to the Official Seed Testing Station for a check test to be made. The fee charged for testing farmers' samples, *i.e.*, samples of seed which the farmer himself is proposing to sow, will be, from the 1st December, 6d. per sample. Hitherto the fee has been only 3d., but owing to the marked increase in the cost of materials and labour, the expense involved in carrying out an individual test is greater even than the fees charged for samples of seed intended for sale, so that it has been found necessary to double all testing fees.

The fees to be charged at the Official Seed Testing Station for samples received on and after the 1st December next will therefore be:—

	Per sample.
For farmers' samples, as described above	6d.
For samples of seed when the test is required for the purpose of a declaration for sale—	
Cereals...	2/-
Roots and vegetables, other than mangold and beet	3/-
Mangold, beet, grasses and clovers	4/-

The address of the Official Seed Testing Station for England and Wales is 18, Leigham Court Road, Streatham Hill, London, S.W.16.

Administration of the Testing of Seeds Order, 1918.—The system of inspection adopted in connection with the enforcement of the Order consists in visiting markets and the premises of seed merchants and farmers who have seeds for sale. The main purpose of these visits is to ascertain whether the regulations are being properly carried out, to examine stocks of seeds, and to draw control samples, which are sent to the Official Seed Testing Station for the particulars declared by the seller to be checked.

Up to the 31st July, 1920, Inspectors of the Seed Control Branch of the Ministry had visited upwards of 3,250 establishments, many on two or more occasions.

In the majority of cases the assistance given by the Inspectors in interpreting points of the Order was greatly appreciated, and in no case was any serious difficulty met with in connection with the taking of control samples.

The number of control samples taken during the 1919-20 season was as follows:—

Root seeds	171
Clover	420
Grasses	318
Farm seeds	67
Cereals	28
Vegetables	202
Total ...	1,206

In addition to the above some 800 small packets of seeds were obtained by the Ministry's Inspectors.

The reports of the Official Seed Testing Station on the 1,206 samples showed that only 109, or about 9 per cent., gave results which indicated that the declaration made by the seller was radically wrong. These included 8 samples of root seeds, 48 of clover, 34 of grass and 19 of vegetable seed.

The nature of the inaccuracies in the declarations may be summarised as follows:—

(*a*) *Germination.*

17 cases in which the discrepancy amounted to from 10 to 15 per cent.
5 " " " " " " 15 to 20 "
14 " " " " " over 20 per cent.

(*b*) *Purity.*

15 cases in which the discrepancy amounted to from 3 to 5 per cent.
6 " " " " " " 5 to 10 "
4 " " " " " over 10 per cent.

(*c*) In 20 cases the presence of dodder was not declared.

(*d*) In 22 cases the percentage of injurious weed seed was incorrectly declared.

(*e*) In other cases the declarations were either incomplete in some details or were not given at all.

The policy of administering the Order in a non-penal manner was continued during the 1919-20 season, and no legal proceedings were taken in connection with any of the above breaches of the Order. In every case, however, the attention of the seller was drawn to the circumstances, and his observations invited. As a result the seed was in most cases either returned to the wholesaler or withdrawn from sale as seed, or the declaration was varied to correspond with the results of the official check test. The commonest defence made by retailers was that they were repeating the declaration of the wholesaler. It was pointed out that in such instances the last seller is responsible for the accuracy of the declaration, and that it is advisable for retailers, in their own interests, to have seed retested from time to time to check the correctness of the wholesaler's declaration.

Testing of Seeds in the Future.—The Testing of Seeds Order, 1918, will remain in force until the 1st August next, when the Seeds Act, 1920 (see this *Journal*, October, 1920, page 604), comes into operation. Declaration of particulars of seed sold will then be compulsory under this Act.

Copies of the Order (price 1d. net) and of the Act (price 2d. net) may be obtained from His Majesty's Stationery Office, Imperial House, Kingsway, London, W.C.2.

* * * * * *

The Smithfield Club and its History.

THE Smithfield Fat Stock Show, held by the Smithfield Club, takes place this year from 6th to 10th December. It is chiefly an exhibition of cattle, sheep and pigs. The animals are first of all exhibited alive and are afterwards slaughtered, the carcasses being quartered, weighed and judged. The live and

dead weights are recorded above each carcass, which is finally sold by auction. Of late years, table poultry has been included in the show.

This well-known exhibition dates from 1799, when the Smithfield Cattle and Sheep Society, instituted in the previous year, held its first show at Wootton Livery Stables in Dolphin Yard, Smithfield. There were four classes, two for cattle and two for sheep, and the prizes offered amounted to 50 guineas. In 1802, the title "Smithfield Club" was permanently adopted. At the first meeting there were 113 members; the number is now over 1,000. In 1800 the Duke of Bedford, then President, in a speech delivered at the annual dinner, defined the real aim of the Society. "Without doubt," said His Grace, "there are two things we are most solicitously to avoid. First, most certainly not to associate to raise prices, and secondly, we ought to prepare no measure which might have even the appearance of raising the prices. The only true object of the farmer is to profit, not by high prices, but by great products."

The primary aim of the Smithfield Club is to encourage the selection and breed of the best and most useful animals for the production of meat and to test their capabilities in respect of early maturity. Owing to the latter consideration, no animal more than three years old is shown, except in the case of Highland cattle. In the opinion of the Secretary of the Smithfield Club, Smithfield Shows have been of great benefit to breeders, as these exhibitions have brought out the potentialities of cattle under proper feeding. Breeders, not only in this country but also abroad, are greatly interested in the result of the competitions. The weights and ages of the animals are published. These records help the farmer in the regulation of food. This important point is further emphasised by the carcass competitions. In a notable instance an animal under three years old weighed one ton.

In former days, cattle of 5 or 6 years old were shown and then fattened. These were unquestionably enormous beasts, but the quality of the flesh was far below the present standard. Nowadays such a policy does not pay; farmers require a far quicker return for their labour and money. In like manner lambs fetch better prices than wethers, and the tendency is towards early maturity. There used to be a class for pigs under 9 months and another for those under 12 months; now the classes are for pigs under 6 and under 9 months old. With proper feeding a pig can be got quite heavy enough in 9 months

at the outside. For instance, a pen of two pigs, prize winners, at 7 months 6 days old weighed 7 cwt. 2 lb.

The prizes to be offered at the 1920 Show amount to £4,594. It is possible for a steer or ox to win prizes to the value of £250; a heifer may win a like sum; a pen of three long-woolled sheep, £110; a pen of three short-woolled sheep, equal; a pen of pigs, £55, or a single pig, £10. Encouragement in the form of prizes is not limited to exhibitors; it is announced that the herdsman, shepherd or pig-feeder who tended stock gaining the first prize in each class will be presented with a sovereign and a framed diploma bearing a suitable inscription. Silver medals will also be presented to the herdsman, shepherd or pig-feeder who fed and attended the best beast, the best pen of sheep and the best pen of pigs in the show.

At the Smithfield Show for 1920 there will also be shown an extensive and varied collection of agricultural implements, including machines by most of the leading manufacturers.

* * * * * *

Village Clubs Association Conference.

AN important conference for furthering the movement for the brightening and improvement of rural life by the provision of centres for recreation and instruction was held by the Village Clubs Association in London recently. The Chair was taken by the Earl of Shaftesbury, K.P., President, who described the aims of the Association. He remarked that in the past the townsfolk had been the spoilt children of social reformers. It was now essential to bring the country into line with the towns, and to give similar advantages to the rural population. There was great need to lighten the burden of life after a long day's work on the land.

The first paper, entitled "The Village Club Movement and its Significance," was read by Sir Henry Rew, K.C.B. (Chairman of the Association), who said that the question of the village was an aspect of the agricultural question. It might be said indeed to be the same question, for if the village depended upon agriculture it was equally true that agriculture depended upon the village.

The next paper, entitled "The Intellectual Demands of the Villagers," was by Mr. A. W. Ashby (Institute for Research in Agricultural Economics, Oxford. Dealing with the question of

the migration of villagers to the towns, the paper stated that the agriculture of a settled country never expands rapidly enough to absorb all the natural increase in the agricultural population, and that although improvements in conditions should lead to our agriculture absorbing the whole of the coming generation, the current of migration must start again later, and be stronger than before.

"The Recreational Demands of the Villages," was dealt with by Major David Davies, M.P., who stated that higher wages, and even a direct interest in the produce of the soil, might not be sufficient to attract and keep permanently on the land a strong and virile population. He added that the need for recreation had now been recognised by the Farmers' Union and kindred organisations.

"The Organisation of the Village Community," was the subject of a paper read by Mr. J. Nugent Harris (Chief Organiser of the Village Clubs Association). Mr. Harris remarked that if it was desired to keep an honest, enterprising, educated and industrious class of people on the land, those who lived on it must be contented with their community life. The Village Club movement would help materially in this respect by bringing the people together and helping them to realise that their interests are identical. Examples of the good results following the formation of a club on V.C.A. lines in various villages in different counties were given.

A discussion followed each paper. Mr. E. W. Langford, President of the National Farmers' Union, warmly supported the movement, and said it was doing work of national importance. The N.F.U. would do everything in its power to further the objects the Association had in view. Mr. Walter Smith, M.P., and Mr. George Dallas, of the National Union of Agricultural Workers, also gave unstinted praise to the work the V.C.A. was accomplishing, and claimed that it was meeting an urgent need in our village life. Further testimony as to the value and need of the work was borne by Lady Denman, President of the National Federation of Women's Institutes, Lord Bledisloe, Mr. J. M. Ramsay, Scottish Board of Agriculture, Mrs. Sanderson Furniss (Ruskin College), Mr. F. D. Acland, M.P., Sir John Green, Miss Lena Ashwell, Sir Douglas Newton and others.

Lord Lee of Fareham, Minister of Agriculture, expressed the deepest interest in and sympathy with this movement,

which was of immense value, and indeed a necessity. To one who was specially concerned with the development of agriculture, with a view to increased production and increased national safety, the problems of attracting labour to the land and of keeping it there were of serious import. Unless the conditions of rural life were made much more tolerable and attractive, it would be impossible to persuade the new and more intelligent class of labour to remain. Among agricultural labourers the War had created a general discontent with the old conditions of rural life, and had aroused a very proper aspiration for wider vision and larger opportunities of thought and instruction. There was likewise something akin to a revolt on the part of the wives against the intolerable dulness of the old village life. This new spirit, and the movement which sought to give effect to it, called for whole-hearted co-operative effort on the part of all classes of the rural community.

* * * * * *

The Equipment of Small Holdings: Cottage Planning.

THE urgent question of housing and of building construction generally is one with which the small holder is vitally concerned, and to supply his needs steps are being taken by County Councils to ascertain the most economic and efficient means of construction.

A comprehensive body of information on the subject has recently been issued by the Ministry in its "Manual for the Guidance of County Councils and their Architects in the Equipment of Small Holdings."* The Manual is divided into two parts: (1) The Planning and Construction of Cottages, and (2) The Planning and Construction of Farm Buildings.

The object of this note is to review briefly that part of the work which deals specially with the country cottage. The intention of the plans set forth is to illustrate the recommendations made and to establish a general standard of convenient planning and stimulate operations consistent with the building traditions of England and Wales. Owing to the abnormally high cost of building at the present time and the need for economy, such a practical guide should be welcomed by all those whose office or profession requires them to face building

* Obtainable from H.M. Stationery Office, Imperial House, Kingsway, London, W.C.2, price 1s. 6d. net.

problems. The Ministry is satisfied that without excessive cost, but by good design, which in a cottage means right proportions and a wise use of materials, the new homesteads may be made both substantial in construction and pleasing in appearance.

Architects employed by Councils are recommended to study very carefully the special conditions of different localities where building is proposed, and so to draft their specifications as to avoid unnecessary expense through specifying rigidly certain materials or treatments when satisfactory and less costly alternatives may be found. It is not considered advisable to impose upon builders any standard form of contract. In many districts it is difficult to obtain satisfactory inclusive tenders for the execution of work on small holdings. It may be a better plan to adopt a form of building contract under which the builder tenders a fixed sum for his services, supervision, use of plant and profit, the ascertained cost of materials and labour, including insurance, being paid separately by the employer. Such a contract would obviate any re-adjustment of conditions which might otherwise be required, owing to recognised advances of the cost of labour and materials as the work proceeds. A form of contract in outline, as circulated to County Councils in October, 1919, is no longer to be had, but another form, circulated to County Councils on 30th March, 1920, provides for a fixed profit to the builder, calculated on a percentage of the prime cost of the work as agreed at the outset, with the addition of bonus to the builder in the shape of a proportion of any saving effected by him on the agreed prime cost. A form of contract prepared on this basis can be supplied by the Ministry for the information and assistance of County Councils. Variations to suit local or particular circumstances should be made in consultation with the Council's Legal Adviser.

General instructions are given as to questions of site and disposition. In the case of a newly created group of small holdings there will usually be greater freedom in the choice of sites, both for houses and buildings, than can be the case on, say, an isolated 10-acre farm. Questions of general policy must be carefully considered and the rival merits of various dispositions and groupings nicely weighed. Very often in choosing the lay-out of an estate for small holdings, regard is paid only to the agricultural aspects of the scheme, the possibilities of any grouping of cottages and buildings being

entirely neglected. If the architectural problem is considered at the same time as the division of the land, some architectural advantage may be obtained without any detriment to purely agricultural requirements. The grouping of buildings should tend to a saving in the cost of building by simplifying the work of supervision and by reducing the cost of the cottages. The possibilities of centralising the arrangements for water supply, drainage and lighting may also offer a means of reducing cost. A principle now, by the process of trial and error, is that the buildings of small holders should as far as possible be grouped together in neighbourly fashion and not dotted about as isolated unsociable units. At the same time, it is to be remembered that against the amenities of centralisation must be balanced the natural desire of the cultivator to live close to his steading and his land, and dispositions should be made that will give the highest common measure of both social and agricultural advantages. Under social advantages are counted the presence of near neighbours, in case of illness or other emergency; possibility of co-operative road transport; post, telephonic shopping and other facilities, as well as opportunities of general social intercourse and the exchange of ideas. Another factor to be considered is greater accessibility to outside influence, for example, by lecturers, agricultural and other.

In choosing sites for cottages important points to be considered are sound foundations, good water supply and convenient drainage. These conditions are most frequently satisfied by a gently sloping hillside. Shelter should be sought from the usually prevailing winds or very infrequent, but searching, north-east gales, or both. This must be obtained by the wise use of natural cover, trees and local accidents to the ground. As a rule adequate shelter can be obtained by the careful grouping of the buildings and by the judicious use of trees and hedges. The maximum of sunlight should always be sought for all rooms except the larder and dairy. In planning each apartment the normal daily life of the inmates must be kept continually in mind. It is desirable that a bedroom should have an eastward window and that the parlour should face the west. If the living-room can command the path of the sun from dawn to dusk, so much the better. A general southward aspect is usually considered the ideal. Sunlight, although very important, is not everything, and care should be taken in arranging the general outlook of the

principal rooms. Successful and well-balanced compromise is the test of group-planning, allowing scope for unlimited ingenuity in the search for ideal solutions to the ever-varying problems presented by cottage-design.

Recent experiments have shown that old methods may be revived with advantage. Among these are building in chalk, cobb and pisé, methods that may help to solve the increasingly difficult problems of transport. These old processes were in former years restricted to the less accessible parts of the country, but now that transport and brick production have become such serious problems in all housing schemes, a general revival of interest in such regional materials and methods would seem to be inevitable. Experimental cottages in chalk and pisé have been built on the Ministry's Farm Settlement, at Amesbury, Wiltshire. An account of this work was published in the issue of this *Journal* for September last.

The general rules for cottage construction indicate that plain, well-proportioned elevations, a simple roof and straightforward planning are more suitable for a small holder's house than any attempts at the picturesque by means of calculated irregularities. The Ministry will not approve any design which indicates that there has been any attempt to secure elegance at the expense of utility. Unless there is any good reason to the contrary a plain rectangular plan should be the aim, neither so square as to necessitate an elaborate, heavy and wasteful roof, nor so attenuated as to be cold, and extravagant through excess of outside walling. Cottages in pairs are not only warmer and less expensive than when erected singly, but they are also more seemly in appearance. Every excrescence or corner, either external or internal, costs money, and should therefore be avoided unless some corresponding advantage is gained by its introduction. The roof should be unbroken, as every départure from a plain, lid-like form involves extra expense in construction and upkeep. Gutters, valleys, flats, and breaks generally should be reduced to a minimum.

The Manual gives schedules for three types of cottages. The first, for a self-supporting small holding of from 10 to 50 acres, contains a parlour, living-room or kitchen, scullery, larder or pantry and three bedrooms. A similar arrangement with a somewhat smaller floor area is recommended for small holdings of from 1 to 10 acres. For cottage holdings of from 1 to 5 acres the parlour may be omitted, the living-room or

kitchen having the same floor area, that is 180 square feet, as in the first schedule. It is recommended that the height of the ground-floor rooms should be kept at 8 ft. from the floor to the ceiling, and this measurement may very well be reduced by a further 6 ins. Greater heights are disproportionate to the other dimensions of cottage rooms, and the space above the window-head only acts as a trap for vitiated air. Were it not for the urgent need for economy the Ministry would insist on parlours being provided in all cottages. This room, with its innumerable functions—reception-room, study, nursery, sick-room, &c.—should be made as comfortable and as attractive as may be. It need not be large, 120 super feet, prescribed in the standard schedule being the maximum allowance. The door should preferably open off the front room and should be as far from the fireplace as the exigencies of the plan permit. As already mentioned, it is desirable that the parlour window should open towards the afternoon sun. The Manual contains detailed plans of cottages of the three scheduled types, and in every case the suggestions show an excellent combination of utility with simple elegance.

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Diseases in Animals during 1919.

A REPORT on the work of the Ministry in connection with outbreaks of diseases among animals during 1919 has recently been issued.* The figures of outbreaks given show that in 1919 the country was affected by disease to a greater extent than usual, Foot-and-Mouth Disease and Rabies being especially prevalent. The existence of these diseases necessitated the imposition of severe restrictions on the movement of animals in infected areas, and the former disease caused the loss of a considerable number of cattle, sheep, and pigs. These two diseases naturally receive principal attention, but Swine Fever, Glanders, Anthrax, Sheep Scab and Parasitic Mange all come under review as being diseases notifiable to the Ministry under the Diseases of Animals Acts. The Report also contains a brief account of the work done during the year at the Ministry's Cattle Testing Station at Pirbright and at the Veterinary Laboratory at New Haw, Weybridge, and in connection with the administration of legislation respecting the exportation of horses, the importation of dogs, and the landing of cattle

* Annual Reports of Proceedings under the Diseases of Animals Acts, the Markets and Fairs (Weighing of Cattle) Acts, &c., for the Year 1919. London: H.M. Stationery Office, 1920, price 1s. net, excluding postage.

from Ireland. A list of Orders made during 1919 under the Diseases of Animals Acts and detailed statistical tables of the outbreaks of diseases among animals are given as Appendices.

In all 84 outbreaks of *Foot-and-Mouth Disease* were recorded during 1919; the principal areas of infection were: Isle of Wight 27 infected premises, Yorkshire 20 infected premises, Kent 7 infected premises, Lincoln 6 infected premises and Warwick 9 infected premises. Slaughter of 3,938 animals in the affected districts was necessary to prevent the spread of infection, viz., 1,625 cattle, 1,541 sheep and 772 pigs. Those interested in the problem of the entry of Foot-and-Mouth Disease into the country will find in the Report a new contribution to the subject, entitled "The Question of Invasion."

The existence of *Rabies* was confirmed in 143 cases (140 dogs, 2 horses and 1 pig), as compared with 112 in the previous year. It will be recalled that the initial outbreak occurred at Plymouth in August, 1918. The number of persons bitten by animals in the Scheduled Areas in 1919 was 179, 46 of whom were bitten by animals proved to be rabid. There were no deaths from hydrophobia. An interesting feature of the Report is a section describing the work on the diagnosis of Rabies.

The number of cases of *Swine Fever* reported during 1919 was 10,359, as compared with 10,203 in 1918 and 10,261 in 1917. The existence of disease was confirmed in 2,317 cases (23 per cent. of the reported cases), the outbreaks during the two previous years being 1,407 (14 per cent. of reported cases) in 1918, and 2,104 (20 per cent. of reported cases) in 1917.

Outbreaks of *Glanders* occurred among civilian horses in 25 cases, all of which occurred in England. Of these 11 occurred in the London area, 10 in London and one in Middlesex. The remaining 14 outbreaks were distributed as follows: 1 in each of the counties of Derby, Gloucester, Hertford, Leicester, Somerset, Surrey, Warwick, the North Riding of Yorkshire and the West Riding of Yorkshire, 2 in Wiltshire and 3 in Staffordshire.

The Report states that as this disease is now approaching the point of eradication, it is proposed to extend slightly the powers conferred on Local Authorities with a view to expediting its disappearance. It is also suggested that more complete control against introduction of Glanders from abroad by imported horses will be necessary.

Reports were received during 1919 in relation to 1,731

suspected outbreaks of *Anthrax*, of which 239 were confirmed by tests for diagnosis at the Laboratory—180 in England and 59 in Scotland. These outbreaks occurred on 221 premises. No outbreak has been recorded in Wales during three successive years.

The number and species of animals affected were: cattle 275; horses 8; sheep 1; pigs 38; total 322, or 1.03 animals per outbreak. One dog and 7 ferrets also became affected.

The disease occurred twice on 9 premises, three times on 2 premises and six times on 1 premises. In other words, in 18 outbreaks on 12 premises disease may have arisen from a previous case in the same year. In all, 60 outbreaks (25 per cent.) occurred on premises on which Anthrax was known to have occurred in previous years.

The report mentions that it is rather remarkable that the outbreaks in England, which fell steadily during the War from 294 in 1915 to 153 in 1918, increased by 27 in 1919. This is probably due to the revival of trade in imported hides and feeding stuffs, the former being largely responsible for the contamination of the latter with anthrax spores in transit. On the other hand, the decline in Scotland has continued from 262 in 1915 to 93 in 1918, with a further decline of 34 in 1919.

The number of outbreaks of *Sheep Scab* in Great Britain during the year was 442. This number includes the affected sheep isolated on the premises of 145 crofters in the County of Inverness. These cases were amalgamated in outbreaks included in the returns for that county on account of the sheep using common grazing grounds.

The 442 outbreaks were distributed as follows:—England 245; Wales 70; and Scotland 127. The outbreaks occurred in 35 counties in England, 9 in Wales and 20 in Scotland.

As regards the English counties, 39 outbreaks occurred in Kent, which had been free from Sheep Scab for a considerable number of years, and 23 occurred in Sussex, an increase of 22 over the previous year.

The Chief Veterinary Officer of the Ministry states in the Report that the time has more than arrived when it should be made clear to sheep farmers that the statutory general dipping of sheep, which is a single dipping, is not a help but a serious hindrance to the eradication of scab. No policy of dipping aimed against scab can be expected to be successful as regards its specific object unless it comprises two dippings with an interval of not more than 14 days, preferably 10 days,

between each dipping. An extension of this interval is contrary to our knowledge of the life history and physical properties of the parasite and its eggs. Several dipping agents can be reasonably relied upon to kill the parasites of scab, but the eggs are resistant to such agents, and they may hatch out after one dipping, only to start the disease over again. If, however, there are two dippings, and the interval between is as above mentioned, the second dipping may be expected to destroy the parasites hatched out after the first dipping before they are ready to lay eggs for another brood.

The single statutory dipping has been a hindrance to the eradication of scab inasmuch as it has had the effect of hiding the visible symptoms of the disease for long periods, giving a sense of false security as regards sheep purchased. Such sheep have only too often passed from the latent to the visible stage, and have been the origin of outbreaks in the flocks of others who have bought them, believing them to be free from infection. Sheep bought at Perth, for example, have caused serious outbreaks in the South of England. It may surprise those who support a policy of single dipping to learn that practically every outbreak of scab which has occurred since the policy of single dipping was introduced as a concession to the views of sheep owners, has arisen from sheep which had been dipped once, or twice with a long interval, during the previous six months. No policy which does not involve double dipping can be regarded as an anti-scab measure. This does not mean that it is necessary to subject all the sheep in the country to double dipping in order to eradicate sheep scab. Such a policy would defeat itself by being excessive, since the areas in which no disease is known are much in excess of those in which it is known or seriously suspected of lurking. It does mean, however, that for purposes of eradication, Sheep Scab must be rigorously attacked in its lurking places, and that any measures which are based upon one dipping, or multiple dippings with long intervals are, as regards Sheep Scab, a waste of effort and money, and are foredoomed to failure.

In the circumstances it would seem advisable that the Ministry should dissociate itself from measures against Sheep Scab which have for their basis a single dipping.

With regard to *Parasitic Mange* it is pointed out that owing to the War the Parasitic Mange Order of 1911 was suspended in August, 1914, until March, 1915, and that it has been

difficult as yet to overtake the strides made by the disease during the suspension of the Order. The total number of outbreaks in Great Britain during 1919 was 5,003 as compared with 4,483, 2,614 and 2,147 respectively, in the years 1918, 1917 and 1916. There has thus been a marked increase in the spread of the disease, which is very prevalent in large towns.

In 1919, although Parasitic Mange existed in all the counties of England, there was a decrease in the number of outbreaks in 21 counties, and no change in two counties, as compared with the returns for 1918, in which year all counties except four, and one free from disease, recorded increased numbers of outbreaks in comparison with 1917. The successful suppression of mange depends almost entirely on the effort of horse owners, but it is to be feared that a good many of them are not giving the matter the attention it deserves. General administrative measures, however, of a more drastic character, may have to be adopted if the individual efforts of horse owners fail to improve the position.

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Poisoning of Live Stock by Yew.

FROM time to time reports reach the Ministry of cases of animals that have been poisoned from eating yew. The details of one of the most recent reports may therefore prove interesting to farmers and others concerned with the care of live stock. The case in question was reported in August last from Surrey. It appears that at a farm in the Oxted Division one cow died on the 8th August, another on the 14th, a third on the 17th, a fourth on the 21st, a fifth on the 22nd, a sixth on the 23rd and a seventh on the 26th. A few days before they died all these seven cows went off their feed and appeared to be suffering from cold. There were twenty-nine cows on the farm, and the latest addition to the herd was made on 2nd October, 1919. The contents of the stomach of the cow that died on 21st August were forwarded to the Veterinary College, Camden Town, for analysis, and the Professor of Chemistry at that College gave it as his opinion that death had been caused by yew poisoning. It has been ascertained that yew trees abound in the places where all the cattle grazed. Since the Professor pronounced his opinion measures have been taken to prevent the remaining cattle having access to the yew trees.

Yew (*Taxus baccata*, L.) is the only British conifer likely

to prove poisonous to live stock in any serious degree. The tree has unfortunately been a frequent cause of fatal poisoning to horses and cattle, and many cases resulting from the animals eating fresh foliage direct from the trees are on record. The bark, leaves and seed are all poisonous, and the leaves are the part usually eaten. Old leaves and shoots are the most poisonous parts, and stock are perhaps more likely to eat the dark green foliage of the yew in winter or during a scarcity of green fodder than at any other time.

Experiments made with autumn and winter leaves indicate that the quantities necessary to kill animals may range from 0.2 lb. per 100 lb. live weight in the case of a horse to 1 lb. per 100 lb. live weight in the case of cows and sheep, but naturally the figures obtained by experiments in this connection vary. Investigations point to the alkaloid *Taxine* as being the toxic substance, although it is doubtful whether this is the only poison present. *Taxine* has a bitter taste, is a heart depressant and may cause death from suffocation. Yew also contains a considerable quantity of formic acid and the irritant volatile oil of yew. The yew is irritant and narcotic, and the poison is not cumulative but rapidly effective, so that in certain cases animals may die suddenly without any previous symptoms having been observed.

When yew hedges and yew trees are clipped it is desirable that the clippings should be removed out of reach of any stock that may be grazing in the vicinity, as otherwise they are liable to be eaten, with the consequences indicated above.

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Importation of Potatoes into Ireland.

By the terms of an Order recently made by the Department of Agriculture and Technical Instruction for Ireland, which came into operation on the 15th November, no potatoes may be imported into Ireland from any country except under licence to be obtained by the consignee in Ireland. Every consignment of potatoes imported must be accompanied by a declaration of the sender in a prescribed form. Forms of application for licences and forms of declaration can be obtained on application to the Department at Upper Merrion Street, Dublin.

Potatoes grown in England and Wales will only be permitted to enter Ireland if a certificate has been issued by the

Ministry, not more than nine months previously, that the potatoes were grown on land which is not situated within a Wart Disease Infected Area and which is not within one mile of any land on which an outbreak of wart disease has occurred. In addition, if the potatoes are of a variety approved as immune from wart disease, they must have been inspected while growing and certified by the Ministry as true to type. The reference numbers of the certificates issued by the Ministry must be quoted by the sender on the form of declaration. Applications for the Ministry's certificate should be accompanied by a declaration signed by the actual grower, stating the variety of the potatoes and the place where they were grown, and declaring that no outbreak of wart disease has occurred thereon.

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New Railway Regulations for Conveyance of Plants and Flowers.

UNTIL 1st March, 1920, plants and flowers in pots could be conveyed at company's risk or owner's risk, at full parcels scale or owner's risk scale respectively, without any special protection.

Notice was given by the Railway Authorities to the horticultural trade that the conditions under which they had been consigning their traffic had been completely cancelled and that, from 1st March, plants and flowers in soil, other than in truck loads, could only be accepted if packed in substantial crates or wooden boxes admitting of traffic being loaded on the top.

In the majority of cases this drastic change would undoubtedly have had the effect of killing the trade altogether, owing to the high cost of crates or boxes. The question was accordingly taken up by the Ministry, and through its intervention the operation of the revised regulation was postponed, on the understanding that a meeting should be convened by the Ministry to give the Railway Companies and the trade an opportunity of ascertaining whether, without the imposition of a prohibitive charge, a reasonable alternative course could be found. Two conferences were held. The Ministry put forward a suggestion to the effect that the difficulty could be overcome by the adoption of two alternative rates for the traffic, one to be applicable to plants packed in the customary manner, while the other and lower rate should apply to plants packed in accordance with the Companies' new regulations.

At a meeting on 31st August, at which representatives of the railways and the trades concerned were present, this proposal was agreed in principle, and subsequently the Railway Clearing House, after further consultation with the trade, decided that from 1st November, 1920, flowers and plants in soil, or in pots, when conveyed in the guard's van by passenger train, will be charged as follows:—

	Company's Risk.	*Owner's Risk.*
(*a*) Packed in substantial crates or wooden boxes so constructed as to admit of other traffic being loaded on top thereof.	General parcels scale, including collection and delivery.	Owner's risk scale, including delivery.
(*b*) When not so packed :—		
1 foot or under in height.	General parcels scale plus 50 per cent., including collection and delivery.	General parcels scale, including delivery.
Above 1 foot in height.	General parcels scale plus 25 per cent., including collection and delivery.	Owner's risk scale plus 25 per cent., including delivery.

In the case of traffic conveyed under Clause (*b*) above, prior arrangements must be made with the Railway Companies as to the quantity which can be accepted for forwarding, when such traffic exceeds one cwt.

The above rates will supersede any existing special rates.

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Allotments: Compulsory Hiring.

THE Ministry has received numerous representations to the effect that in many boroughs and urban districts Councils have not satisfied the outstanding demand for allotments and, when pressed by the applicants, have stated that they are unable to acquire land, owing to the owners being unwilling to let and to all available land being either building land or having a prospective building value. Councils have stated that, in such circumstances, they cannot acquire land at a price or rent sufficiently low to enable them to let allotments without incurring loss. It seems to the Ministry that the position taken up by such Councils is based on a misconception of the provisions of the Small Holdings and Allotments Acts, 1908 to 1919, with regard to the compulsory hiring of land for allotments.

A Council can make an order authorising them to hire land compulsorily for a period of not less than 14 years and not more

than 35 years. The amount of the rent will be fixed in default of agreement by an arbitrator, who is required to take into consideration the rent (if any) at which the land has been let, the annual value at which it is assessed for income tax or rating, the loss (if any) caused to the owner by severance, and the terms and conditions of the hiring, *but he may not make any allowance in respect of any use to which the land might otherwise be put by the owner during the term of hiring, being a use in respect of which the owner is entitled to resume possession*—i.e., *building, mining or other industrial purposes, or for roads necessary therefor.* (*See* paragraph (4) of Part 2 of the First Schedule to the Act of 1908 and Section 46 of that Act.)

The compulsory hiring provisions of the Acts enable a Council therefore to obtain a tenancy of land which can be renewed by the Council without the owner's consent, at a fair rent fixed without regard to any immediate or prospective value which the land may possess for building, mining or other industrial purposes, but subject to the landlord's right of resumption if he satisfies the Ministry that he requires the land for such purposes. The Act of 1908 as amended by the Act of 1919 enables the notice of resumption to be such as is prescribed by the Hiring Order, but so as not to require a longer notice than twelve months.

The Ministry understands that in some cases Councils have hesitated to use their compulsory hiring powers on the ground of expense. The expenses incidental to the compulsory acquisition by hiring need not be considerable, and when the land is acquired all such expenses can, if so desired, be borrowed by the Council and can be recouped during the period of the lease by a very small increase of the allotment rents. Councils have been urged, therefore, to take immediate steps to hire land, if necessary compulsorily, to satisfy the requirements of applicants where an unsatisfied demand exists.

The Ministry regards the encouragement of the allotment movement as a matter of the most urgent national importance, not only from the point of view of the maintenance, and possibly the increase, of food production, but also on account of the social and economic advantages of the movement. Allotments provide healthy and profitable occupation, create a spirit of co-operation and goodwill, and do much to allay industrial unrest and disturbance.

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London Thoroughbred Stallion Show, 1921.

The Ministry gives notice that a Show of Thoroughbred Stallions will be held in conjunction with the Hunters' Improvement and National Light Horse Breeding Society at the Royal Agricultural Hall, Islington, on 22nd, 23rd and 24th February, 1921. A Challenge Cup, presented by His Majesty the King, will be awarded for the Champion Stallion in the Show; and a Gold Medal will be awarded by the Ministry to the owner. Sixty King's Premiums (including twelve Super-Premiums) will also be offered for award by the Ministry on conditions similar to those which obtained at the Show held in March last.

The average value of a King's Premium, paid by the Ministry, is £350, and the average earnings of a stallion £410. The twelve Super-Premiums carry an additional value of £100 each.

After the routes of the King's Premium Stallions have been settled, a limited number of Ministry's Premiums will be available for award. The average value of these Premiums, paid by the Ministry, is £200, and the average earnings of a stallion £270.

Forms of entry for the Show may be obtained shortly from the Offices of the Ministry, Whitehall Place, London, S.W.1. The last date for the receipt of entries is 17th January, or for post entries 24th January.

No entry will be considered in respect of a stallion unless licensed under the Horsebreeding Act, 1918, for the 1921 season. Applications for such licences can now be made to the Ministry.

SPEECH BY THE MINISTER OF AGRICULTURE AT LEICESTER.

THE following is the text of a speech by The Lord Lee of Fareham, Minister of Agriculture and Fisheries, at the de Montfort Hall, Leicester, on Saturday, 16th October, 1920:—

LORD LEE: Mr. Chairman, Ladies and Gentlemen, I am afraid it is some months since I last had an opportunity of addressing a meeting of agriculturists. That has been due partly to reasons over which I have had no control and partly to the fact that I know that, during the harvest season at any rate, farmers have something better to do than to be attending afternoon meetings listening to words however wise, or however foolish, or, at any rate, however eloquent. I know they have been very much better employed. To-day, however, I am delighted to have this opportunity of meeting so large and representative a gathering, not merely of farmers, not merely of landowners, not merely of labourers, but a gathering representing, as I believe it does fairly, the agricultural industry as a whole. (Hear, hear.)

The Ministry of Agriculture: Misconceptions as to its Functions.—The first point that I want to make is that the Ministry of Agriculture is concerned with the interests of the industry as a whole, that it has no preferences or prejudices as between this or that section of the agricultural community. It is anxious to help them all, so far as it can, because it knows, as you must know, that each section is absolutely indispensable to the others. I particularly resent the suggestion, because it is grossly untrue, that the Ministry, whenever it takes some action which may not commend itself to this or that section, is showing an undue preference; that it is throwing its weight in favour of one section as against another, either in its administrative acts or in the legislation which it is its business to introduce. I am sure charges such as those are due, in almost every case, to a genuine misunderstanding as to what the true functions of the Ministry of Agriculture are, and what its relations to the industry should be. In my experience there are two common but quite opposite misconceptions as to the duties of the Ministry of Agriculture. The first of them is that the Ministry wants, in some way or another, to direct and control the whole of your business, and to do that by means of interference by what is commonly called, I think, an "army of inspectors from Whitehall." Apart from the fact that we have no accommodation for

an army of inspectors or anything else in Whitehall—the Ministry of Agriculture is a shockingly overcrowded establishment—that is not our desire in the least. Then there is the other misconception, rather the opposite one, that it is the main business of the Ministry of Agriculture to be always trying to wring concessions of some kind or another, for farmers in particular, out of a reluctant Cabinet and Parliament, and whilst it is very seldom thanked if it is successful in those matters it is as invariably abused if it happens to be unsuccessful. My conception of the functions of the Ministry of Agriculture is entirely different. I do not think it should be either a controller or a wet nurse of British agriculture. It is true it is its representative in the Government, its spokesman in Parliament, and I hope when occasion demands it will try to be its big brother in both those bodies.

Disappearance of Control.—But to go back to the first point, it is certainly not the desire of the Ministry, so far as I have anything to do with it, to exercise undue control; indeed my ambition, since I have been there, has been to try and get rid, at the earliest possible moment, of all the controls of prices which were exercised and which were necessary during the period of the War and the period that immediately followed. (Cheers.) I claim that I have been largely successful in the pursuance of that policy. Anyhow I have done my best, but I must point out quite frankly that I have not always been helped by farmers with regard to this matter. There have been notable instances, for example, with regard to home-grown meat, where I have been opposed, and in the end practically voted down by the farmers themselves. One of the unhappy results of years of control during the War has been that it has made some farmers hug their chains in the belief that if they were removed they would not be as comfortable as before.

Wheat Prices.—Every one of those controls has now gone, with the exception, and I believe it is the sole exception, of the price of wheat in connection with the harvest of 1920. So far as next year's harvest is concerned a guarantee has already been given by the Government that there shall be a free market. I am well aware—if nothing else, my postbag would remind me constantly of the fact—that it is a very sore point with farmers at the present time that they are not allowed a free market for their wheat of the present harvest, and I am inclined to sympathise with them. I do not mind saying that I have done my best to get that view considered by the Government, but neither the Minister of Agriculture, nor any other Minister, can expect

to have his own way in everything that he thinks is right for the particular industry which he represents, because very often there are other considerations far more serious to the nation than even the rights or the prosperity of a particular industry, even of an industry so important as agriculture. At the present moment we are faced with a rise in the price of the loaf, at a time of industrial unrest, which has come to a most disastrous point to-day in the launching of this coal strike. There are dangers ahead of us this winter so grave that every man must be prepared, so far as he is able, to sink his own personal interest, and the interest of his pocket, if thereby he can better safeguard the interests of the nation. I am convinced that in these matters one never appeals to the patriotism of the agricultural community in vain. They have rendered services, not only during the War, but in every crisis of the country's history, which have been at least equal to those of any other section of the community. I know if they are asked to be patient with regard to this matter the appeal will not be made to deaf ears. I would ask them also, in their own selfish interest, to consider this, that if at the same moment that it has become necessary for a rise in the price of the loaf to take place, it were announced that an additional price was to be given to farmers for their wheat this year, over and above that which was promised, and which was the basis of an understanding six months ago, I believe there would be an outcry, and an amount of industrial unrest which would do far more harm to the farming industry in the long run, and to the position of farmers generally, than they would gain from the small financial benefit which they would get at the moment. But that does not alter my view that these controls of prices are bad for production, and it is because they are bad for production that I have opposed them, and done my best to get rid of them at the earliest possible moment. It is quite clear, and after all it is only the economic law, that controls of this kind result in short supply. De-control, on the other hand, means stimulus to production. We have seen that again and again, and I believe it is practically a law of nature. The policy, or the principle, which I have been pressing upon the Government and Parliament during the time that I have been at the Ministry of Agriculture, has been practically this, that "free conditions breed enterprise." That is what the farming industry needs more than anything else in the world.

Control of Bad Farming.—So far as I am concerned, the only control that I want to see retained, and that I shall fight to

retain, is what is commonly called the control of the bad farmer. (Hear, hear.) I have never found in any meeting of farmers that that was an unpopular proposal. No one likes the black sheep in his own flock. I know I shall have the support of the entire farming community behind me in that. May I say this in the presence of the two principal officers of the Farmers' Union: a great temptation in one sense was put in their way when the Agriculture Bill was going through Committee in the House of Commons, and the control of cultivation was so whittled down as to be practically worthless. They stood to their guns, however, and said: We recognise it is fair that we should submit to control if we get the benefits and guarantees provided by the Bill. I think that was a fine example of straight dealing and courageous leading. With regard, however, to this question of control of bad farming, let me assure you that I have no desire whatever that it should be exercised from Whitehall by this "army of inspectors" who come down from London in express trains and tell the farmers of Leicestershire how they ought to run their business! That is not what is wanted, and certainly it is not going to be done. As you know, the County Agricultural Committees have now been reconstituted. They consist of representative local men, and in most cases every agricultural interest is admirably represented upon them. The bad farmer will be judged, not by an inspector from Whitehall, but by his neighbours and by practical men in his own district. Surely there can be nothing fairer than that.

Farming not a Depressed Industry.—Then may I say a word about what I call the second misconception as to the duties of the Ministry, one which is perhaps more widespread, and certainly equally mischievous. In my view British agriculture to-day is neither a helpless babe wanting a nurse, nor is it a spoilt child waiting to be bribed. I am convinced that farmers do not need spoon-feeding in the conduct of their business, and, therefore, the Ministry is not to be judged by the amount that it does for them in those respects, or by the number of concessions, so called, which it manages to wring from the Government on their behalf. Farming to-day is not a depressed industry, and it is very unwise on the part of farmers or anyone else to try and create the impression that it is. After all, we want to attract to the industry the very best men in the country; we want to attract more capital, more brains, more energy; and if for no other reason, because the nation needs increased home production. (Hear, hear.)

Need for Increased Production.—Mr. German asked me whether that really was needful at the present time. I venture to say there never was a time when it has been more needful, except possibly at the height of the submarine campaign, and as the inevitable shrinkage of production goes on all over the world, or, at any rate, in those countries upon which we have been accustomed to rely in the past, it will become more and more a matter of national necessity that we should produce the absolute maximum that is possible from our own soil at home. Therefore we want to get the best men into farming. We want to get all the capital and brains and energy that we can; and the more men of that kind that come in, and the more production there is, the more will all engaged in agriculture, in every section of the industry, prosper by it.

The Proper Functions of the Ministry.—Now, having described some of the things which it is *not* the business of the Ministry of Agriculture to do, may I touch for a few moments upon the things which I consider to be its principal business, and which I claim it is already doing. Speaking generally, it is the business of the Ministry to be the guide, philosopher and friend of all sections of the industry, and to place at their disposal every new development from research, education, and so forth, that can be discovered; to protect the industry, so far as it can, from epidemics of disease and pests; to organise it in the counties, so that its voice shall be more effective in the councils of the nation; and to defend it against unfair attacks from wheresoever they proceed; in fact, to see in these matters that it gets a fair field and no favour, which I am sure is the most that it desires. As I say, we are endeavouring to fulfil those duties, and I am not ashamed of our record up to date.

Research and Education.—The first in order of importance, without doubt, is the work which we are doing in research and education. Perhaps it will give you an idea of the great increase in that work if I tell you that the amount of money which has now been allocated, and which we are spending every year upon agricultural research and education, is about eight times what it was just before the commencement of the War. With that money—and I venture to say we are spending it well and prudently—we are creating a network of organisations, in many cases not entirely new institutions, but we are establishing or subsidising centres at universities, colleges, and farm institutes, and advisory experts in the counties. They are all working together, and to one end, with the finest kind

of " team play," to give farmers and agriculture the latest and best information with regard to the developments of science. We are working up all those agencies. They are all, of course, co-ordinated under the Intelligence Department of the Ministry, which is presided over with so much distinction and ability by Sir Daniel Hall. This is not merely a policy of theory, because it is already producing very remarkable practical results. I think most of the progressive farmers in the country are aware of the wonderful work which has been done by Professor Biffen and others in producing new varieties of seed which are calculated to resist some of the risks of our climate, and to show a heavier yield. Many farmers who are not progressive are using wheat such as Little Joss, Yeoman, and so forth, without realising that the creation of those wheats is due to scientific work in the laboratory under the inspiration of the Ministry of Agriculture. Then we have initiated throughout the country—and I speak of this because sometimes I have been accused of wanting to plough up the whole of the shires and reduce Leicestershire to one brown arable area—we are devoting especial pains to the campaign for the improvement of grass lands, and it has caught on already in a most remarkable way. We have shown, and proved to the satisfaction of farmers in different parts of the country, that, by following proper methods of manuring, the productive capacity of their grass land may be trebled and even quadrupled. Then we have devoted time and thought to the development of agricultural machinery, and in that connection I have no intention of apologising for the work which the Food Production Department did during the War in importing and trying, and exposing where they were worthless, tractors of every sort and kind from every manufacturing country in the world. Although we have been accused of having spent a great deal of money, or lost it, in this matter, I venture to say we saved the farmers of this country at least twenty millions of money, and ten years of time, instead of letting them find out for themselves, at the expense of their own pockets, which machinery was reliable and which was not. Then we are conducting a great series of experiments in arable dairy farming to show what great economies may be effected with regard to feeding stuffs, which are such a serious expense at the present time, and how the production of milk may be made cheaper.

Milk Recording Scheme.—Then there is the Ministry's scheme of milk recording. I do not know whether farmers

realise the extent to which that is already benefiting the pockets of those who have come into the scheme. The scheme, I am thankful to say, is growing. Two years ago there were 20,000 registered cows; last year there were 38,000; and this year there are over 50,000. I hope the scheme will spread like wildfire. It is still in its infancy, at any rate. But apart from what it has done in the way of increasing the production of milk, the financial results have been extraordinary. I was looking only yesterday at some of the recent sales, during the last three weeks, of non-pedigree certificated cows under our recording scheme. At the first sale 62 of those non-pedigree cows sold at an average of 104 guineas apiece, simply on account of the Ministry's certificate. Three sold for over 200 guineas. At the second sale 34 cows sold at an average of 88 guineas, six of them over 100 guineas. The third sale, I think only a week ago, showed an average of 91 guineas, with nine over 100 guineas. Any farmer can see for himself what that means in gain to his pocket, and I think the Ministry may claim some credit for that.

Animal Diseases and Pests.—Then with regard to protecting the industry from epidemics of disease and pests, you are all aware that we have had a particularly anxious year with foot-and-mouth disease and rabies, and it has been the painful duty of the Ministry to exercise its powers with vigour and relentlessness in the interest of the farming community. We have, at the same time, studied the convenience of the industry as far as we could; and at any rate we have been successful more than once in stamping foot-and-mouth disease out altogether. I called this morning for the latest position, and I find that in spite of recent outbreaks there is now only one small district in the country where there is any foot-and-mouth disease left, or where there are any severe restrictions maintained, and we hope that these will all be removed, unless there is a fresh outbreak, before the end of the present month. But we are not content with stamping out the disease wherever it appears, by slaughter. For the first time I think in the history of this country we are initiating a scientific investigation, without undue regard to cost, with the determination that it shall be thorough and searching, into the nature of this pest and the means of grappling with it. I am inviting the services of the most distinguished scientists from any part of the world to come and help us. All I ask is, having set this great inquiry on foot, that there will not be any undue impatience as to the

result. These investigations take an immense amount of time; they may take years. Every country that has tried to grapple with the problem has failed so far. The task is obviously one of enormous complication and difficulty. Therefore I say it will take a long time, and I hope you will wait with patience for the result. I will not say much about our war on rats, except to remind you that the next "National rat week" is from November 1st to the 6th, and that England expects that every farmer will do his duty.

Importation of Stores: A Warning to Farmers.—In connection with this matter of cattle disease, I am, as you know, being constantly pressed by certain interests to admit store cattle from abroad, and for reasons which I regard as good and sufficient I have absolutely refused to consider making any change in the existing law.* (Hear, hear.) I am not going to argue the case here again to-day, but I want to give one solemn word of warning to farmers generally. There is, as you know, a very remarkable and regrettable falling off in our herds throughout the country; the latest returns show an almost sensational drop; and it is due very largely to the abnormal slaughter of calves that is going on throughout the country. (Hear, hear.) I am aware that there are difficulties in rearing, but this excessive slaughter is primarily the result of tempting prices for veal. I can only say that if that is continued to a point where there is a shortage of stores so great that our herds cannot be maintained, then there will grow up an irresistible, and I fear a much more justifiable, demand than there is at the present time for importation of store cattle from abroad, with all the risks that that may mean to the health and safety of our herds. Unless, therefore, this indiscriminate slaughter of calves is stopped, and unless there is more breeding and rearing, those who are with me in thinking that store cattle should not be admitted will be selling the pass and destroying their own case.

Agricultural Organisation: The New Committees.—There is only one word I want to say with regard to the new organisation of agriculture in the counties. I have great hopes for the industry, as well as for the Ministry, in these new Agricultural Committees. I am hoping that they will be the eyes and ears of the Ministry in the counties; that they, through their National Council of Agriculture, one for England and one for Wales, will have what I may call their Agricultural Parliament, and that that again will elect what I may call an

* See note in the issue of this *Journal* for last month, p. 704.

Agricultural Cabinet in the Central Advisory Council which is to be constantly at the elbow of the Minister of Agriculture, to keep him straight and in touch with the views of the farming community throughout the country. With regard to the Central Advisory Council, I am going to be bold enough to say that whilst as Minister I shall be the nominal chairman or presiding officer of that Council, I want to have as the real acting chairman a practical farmer of the highest standing and reputation amongst his own people. (Cheers.) That will, I hope, satisfy the demand for what is commonly called "a practical man in Whitehall." (Laughter.)

Recent Legislation: Seeds and Fertilisers.—Now a few words about our legislation. I have been talking to you hitherto about our administrative Acts. I have referred to the Bill which formed these County Committees, and before I come to a larger Bill I want to mention two other Bills which we passed through Parliament last Session, and which attracted very little attention, but which I think are going to be of immense service to agriculture as a whole. The first was the Seeds Bill. That is a little Bill which may have great consequences. It forbids the sale of bad seeds or weed seeds. If there is anything which is the curse of the farmer's life I believe it to be weeds, particularly during the past summer. By this Bill we are endeavouring to tackle the trouble at the right end, and that is to prevent the weeds being sown, instead of dealing with them afterwards. I do not want to go into the details of the Bill now, because it does not come into full operation until August of next year, but I venture to say that as a result of that Bill British farmers will be better protected against bad seed and weeds than any other farmers in any other country in the world. (Cheers.) The other small Bill was the Fertilisers Bill, by which we are going to maintain control of the export of fertilisers from this country. (Cheers.) In the present condition of the world that is the only way in which the supply can be maintained and prices kept down. I think that will be recognised as being a vital need for agriculture. The Ministry has further so stimulated the manufacture of artificials in this country that at the present time four times the amount of sulphate, and three times the amount of basic slag that were used before the War are being used to-day. (Cheers.) Those are important results.

The Agriculture Bill.—I am sure you will expect me before I sit down to say a few words about a much bigger Bill, and

that is the Agriculture Bill that is now before Parliament. (Cheers.) Do not suppose for a moment that I am going into a long discussion with regard to the details of the Bill. After all, I am going to have plenty of that in the course of the next few weeks. My friend, Sir Arthur Boscawen, will have it first in the House of Commons; I shall have it later in the House of Lords. I am not going to anticipate all that. I recognise—I hope my eyes are as wide open as most people's in this matter—that there is considerable difference of opinion with regard to the merits of the Bill. Some people say: " Much too severe "; others say it " does not go nearly far enough "; others say it is a " very good " Bill; others say it is " rotten "! (Laughter.) So, balancing all those things together, I am coming rapidly to the conclusion that the Bill must be just about right. (Laughter.) At any rate, I claim that it is an attempt to do evenhanded justice all round, with due regard to the necessities of the times, to the landlord, to the tenant, and the labourer alike. I do not say that it is particularly popular with any of them. If it were I should be at once accused of introducing a sectional measure. From what I have heard recently I gather that it is perhaps even less than popular with the landowners, but I can assure them that I have a very sincere desire to be fair in connection with this Bill, and if for no other reason, because the services that the landlords of this country as a class have rendered to agriculture and to the nation have been many and most striking. I venture to think that those farmers who have now acquired their own farms, and are their own landlords, are beginning to realise the truth of that statement in a way that they never realised it before. A friend of mine who purchased his holding about two years ago said sadly the other day that he was the worst landlord he had ever had. (Laughter.) Owing to the conditions of the times, and new taxation, and so forth, landlords are, in many cases, forced to sell; they cannot possibly afford to carry on; and that throws upon the Government the necessity of trying to protect the reasonable interests of the tenants, and, at any rate, to see that they have that sense of security, without which it is hopeless to suppose that they are going to show any enterprise or increase production. I say this with all seriousness and earnestness to the landowners, that although there are many things in the Bill which they may not like, I venture to think that it offers a fairer settlement than any future Parliament is likely to offer them, and that it represents the only alternative to either fixity of tenure or land nationalisa-

tion. If, in spite of this, Parliament should decide to reject the Bill, I can only say that, so far as I am concerned, I shall not introduce another, and I doubt very much whether anyone else will ever be in a position to propose such favourable terms again.

Difficulties in the Way of Retrospective Legislation.—Now a point about tenants. I hope you will agree that I am not seeking to shirk any difficult points. I know there is one difficult point, and if I do not mention it now I shall be asked about it afterwards, and that is with regard to the position of tenants whose tenancies came to an end at Michaelmas, and who wish the provisions of the Bill to be made retrospective. I have very great sympathy with those cases. I have thought a very great deal and very anxiously about them, and I have gone into all the possibilities on one side and the other. I recognise that owing to the fact that when the Bill was originally introduced we said we wished it to come into operation on September 1st, great expectations were aroused. But the discussions have taken longer than we anticipated. Other matters have come in the way, and now the Bill obviously cannot be law by September 1st last. I am not going to give any pledges, I hope it may be passed by January 1st, but certainly not before then. As a result of this delay a large number of tenants, notably in Worcestershire, have been very seriously affected by losing the protection which the Bill would have given them if it had been law by September 1st. But after all the principle of the Bill was that only tenancies which expired after the Bill was passed should reap the benefits of its provisions. We were too optimistic about the date. We could not foresee some of the delays. The House of Commons refused, perhaps very rightly, to be hurried, but the results are none the less unfortunate and hard for those particular tenants. In every situation there are hard cases, but the trouble is I do not see any practical way of dealing with this particular one. Parliament has a particular dislike of retrospective legislation; it has been tried again and again and nearly always been rejected; and I see very little hope of the House of Commons adopting a different view now. In many cases settlements have been effected with regard to these changes of tenancies, and it would be impossible now to re-open settlements which are already closed. Generally speaking, the difficulties are so great that, most regretfully, I have come to the conclusion that there is no chance of this portion of the Bill being made

retrospective. On the other hand, we are proposing to give landlords the right, if they choose, to withdraw notices which they have already given, in cases where they find that they would be unable to face the compensation which they would have to pay if the tenant was forced out.

The Position of the Bill.—I am not going into details any further. They will be threshed out almost immediately in Parliament. But I am aware of the fact that opponents of the Bill have been very busy during the Recess in working up, quite legitimately, opposition against it. It is therefore necessary to say this. The Government is determined to pass this Bill into law this year, if and so far as they have the power to persuade Parliament to do it. (Cheers.) I can tell you, on the authority of the Prime Minister himself, that he regards this Bill as almost the most important item remaining in our programme—(cheers)—that we are pledged to it up to the hilt, and we are going to leave no stone unturned in order to get it through. (Cheers.) In saying that I do not mean we are not going to be reasonable and conciliatory in debate. But at the same time we are determined, and whilst, of course, we are dependent upon Parliament, I can only say for my part, and for the Government of which I am a Member, that we are going to do our utmost to carry out that undertaking.

Profiteering Charges.—Mr. German asked me to say a word about the charges which have been launched against farmers with regard to what is commonly called profiteering. I do so very gladly, because I feel strongly on the subject. Quite apart from the fact that people who criticise, as a rule, have not the remotest conception of the heart-breaking risks and trials of farming in our climate, of the way in which the whole of a man's energies and money may be practically lost in a few days by some turn of the weather, it seems to me that this charge of profiteering directed against farmers is peculiarly unfair and ridiculous. After all, the farmer does not make his own market; he does not fix his own prices; he has no rings or combinations of his own, although he often has them against him. What does he do? He sends his produce to market, and he has to take the market price that is offered, very often at auction. Sometimes the profit is high; sometimes it is low; sometimes it is none at all; but if it is high, is it really seriously contended that he should refuse it; is it seriously contended that he should refuse a price which is offered to him openly? Apart from the fact that he would be a fool if

he did—(laughter)—it would not be the *consumer* who would benefit. If the farmer said: "No, that is really too much; oh no, I could not accept that," it would be merely the middleman who would take the profit, and the consumer would be no better off. When I hear this talk of profiteering, and I think I have heard of it especially with regard to milk, I am struck by the fact that with regard to last winter's milk production there was a very elaborate inquiry by the Costings Committee of the Ministry of Food, and that Costings Committee, of a Ministry which is generally supposed by farmers to be none too friendly to agriculture, reported that the average cost of production of milk last winter, taking the country as a whole, was 3s. 1½d. per gallon, whilst the average price that was paid to the farmer, taking the country as a whole, was 2s. 8d. There is a shocking case of profiteering by the farming community. (Laughter.) Of course, it is impossible to prove what may have taken place in this or that individual instance, but I am convinced that the charge of profiteering, generally speaking, is both baseless and unfair. (Cheers.) But that does not mean that we want to go to the other extreme, and say that farming is doing badly, because undoubtedly prices are better than they were, relatively, and farmers are doing better than they were before the War; and a very good job too for the nation. (Cheers.) It is about time in the national interests that farming was doing better. (Cheers.) In that connection I want once more to beg of farmers that they will not be crying wolf too often, or saying that "the outlook is black and absolutely hopeless," or that "farming does not pay," because, in the first place, it is not true, and, secondly, because it really does injury to the industry to which, as I say, we wish to attract the best men. Farmers grumble a good deal about the rise in cost of production, but I do not hear them boast very much about the rise in cost of produce, yet there is a little balance on the right side. And I want them to realise this, that Labour is entitled to a share of that. (Hear, hear.)

The Claims and Rights of Labour.—This is my last point. The relations of labour to production is by far the most serious problem which confronts agriculture to-day. It is a vital question; it is urgent; it is unescapable. There is no subject in the whole range of agriculture in which I am so deeply concerned and interested as the labour problem, and there is no subject with regard to which my sympathies are more deeply aroused. Farmers owe a very great deal to their skilled

labourers. (Hear, hear.) They are one of the most skilled class of workmen in any trade in any country. I believe someone said that it is much easier to replace a Cabinet Minister than it is to replace a ploughman; I accept that! (Laughter.) And, what is more, these skilled men have shown, throughout these times of trial, during the last few years especially, very little tendency to ca'canny, and very little tendency to strike. The farmers have reason to be grateful for that—(cheers)—and if they would look a little more upon these men as their partners in the industry, and would see that it is really in the interests of the employer, quite as much as that of the men, that they should be content, that they should be well paid, that they should have reasonable conditions of work and housing, it would benefit the farmers quite as much as anybody else. After all, the labourers have had a real and lifelong grievance as a class; now the sins of the fathers are being visited on the children; and there is a great deal that has to be done in order to give the labourer that full share to which he is entitled in the prosperity of the industry. As regards wages, I think that question is going to right itself by the usual process of negotiation and examination by the Wages Board; but there is one problem which is unsolved, and which, so far as I can see under present conditions, is almost insoluble, and that is the question of the "tied cottage." It is a real hardship to both sides. Tied cottages are essential for some men on the farm; and I was very glad to see that recognised frankly and fully in an article which I read in the "Land Worker," the organ of the men's Union. But if a man is turned out, if a man has to go, he must have somewhere to go, and the houses do not exist. They have got to be built, but who under present conditions can build them? Who can afford to build them? The Government is doing its best to push on with housing, but it cannot get the labour. More houses is the first and the most important need of the nation to-day, and if the Building Unions cannot deliver the goods then we have to get them in some other way. (Hear, hear.) Speaking with all due responsibility as a member of the Government, I say we are determined to have these houses. (Cheers.) This is not the time when the nation can be held up by some rigid trade union rules which will forbid even an ex-service man, who has fought for his country, from joining in the building of house in which he is going to live, because he has not been apprenticed to the trade from his youth.

There is only one other point with regard to labour. There is a certain amount of unrest amongst agricultural labourers

at the present time owing to rumours of discharges on a large scale due to a reduction of the arable area. I am not willing to believe that there is very much in that, although in some cases there may be. There are some farmers who are affected by panic, and who think, on account of the higher wages, their only safety is to put more of their land down to grass. If there is any deliberate movement of that kind, there could be nothing more dangerous or fatal to the agricultural industry. It would create an army of landless men, men who understand work on the land, and who would make an irresistible demand, with justice behind them, to have that land broken up and given to them to deal with as small holders. If farmers were led into that mistake they would be simply cutting their own throats and destroying their own position. I trust the new County Agricultural Committees will exercise a very firm hand in regard to this matter. Meanwhile I implore both masters and men to take every opportunity of getting together and discussing and understanding each other's difficulties. If only the two sides would meet more often there would, I am convinced, be a better understanding. The great danger to-day is that there is so much mutual distrust and misunderstanding that rash steps are taken which are very often irrevocable. After all, all sections of the agricultural community must work and stick together, because no one can settle their differences except themselves. The Government cannot do it; certainly the Ministry of Agriculture cannot do it. What we want to avoid at all costs is any repetition of the Holderness tragedy. If from exasperation and lack of understanding the labourers say just at harvest time to the farmer: "Now we have you by the throat and we are going to have our terms," the farmer naturally retaliates and says: "This may be harvest time but winter follows harvest." There would be retaliatory discharges and every sort of bitter feeling. All that would be unnecessary if masters and men would get closer together. Do not look to the Government; do not look to any outside tribunal in these matters; get together and thresh out your difficulties. You must always remember that neither side can prosper unless the other is reasonably prosperous also.

"Pull Together."—My final word to you is to re-echo what the Prince of Wales said on his return from his tour the other day: "Pull together."

THE ENCLOSURE OF OPEN-FIELD FARMS.

The Right Hon. Lord Ernle, M.V.O.

The threefold division of the agricultural interests into landlord, tenant-farmer and wage-earning labourer, as well as the individual occupation and cultivation of agricultural land, are relatively recent growths in many parts of this country. As compared with the much older system of open-field farms, cultivated in common on co-operative principles by associations of occupying co-partners, they are a modern development. The change from the one to the other has been a slow but continuous process. Already in progress at least as early as the reign of Henry III, it was not completed until the first half of the nineteenth century. Even then the older system has lingered on in remote country districts. Many of us have seen it in active operation. Though now it has been completely superseded, it has left traces, which, to the eyes of all who have studied the subject, are broad and deep, on the general aspect of almost every county in England, but especially in the east and centre, on the laying out of roads, on place and field names, and on the surnames of the rural population.

The substitution of the individual occupation and use of agricultural land for the older system of common cultivation was carried out by enclosures. In its effects on the rural population the enclosing movement is an important, and, in some aspects, regrettable development in the social, if not the economic, history of the country. Its character, causes and conditions have within the last quarter of a century attracted the increasing attention of historical students. Of recent years it has become, for obvious reasons, a favourite battle-ground of political theorists. For the most part the movement has been exclusively studied in its social and political effects. Stress has been rightly laid on the distress caused by the break-up of the agrarian partnerships and on the disastrous consequences of the divorce of the peasantry from the soil. Use has been freely made of a considerable literature of protest and denunciation. The vigorous, picturesque language of sermons, pamphlets and popular verse has been liberally quoted without much discrimination. But very little attention has been paid to the practical questions involved. There is, in fact, a side of the movement which has been unduly ignored

by both historians and politicians. It is the agricultural side. From this point of view the subject of enclosures is suitable for discussion in this *Journal*. But so universal has been the reconstruction of the agricultural industry on the lines with which we are now familiar, and so completely has the older system disappeared from our midst, that it is necessary to begin with a brief description of the open-field farms which, 250 years ago, still formed half the area which was then in cultivation. The picture must necessarily be a general one. Space allows of nothing else. But wide modifications in the system, due to customary variations or local peculiarities, are so numerous, that in its broad features only is the description universally true. Any examination of the origin of the system would be out of place. To discuss it would be to go back into the mists of antiquity, and enter on a region of acute controversy, legal, historical, political and social.

The land of a Manor in the fourteenth century was divided into three unequal areas. The smallest portion was a compact enclosed block, reserved for the private use of the lord, and held in individual occupation. A far larger part was occupied and cultivated on co-operative principles by the villagers in common, as an association of co-partners, both free and unfree, under a rigid regulated system of management which was binding on all the members of the association. The third part was the common pasture, fringed by the waste in its natural wildness. Over this pasture and waste common rights were exercised by the lord of the manor in virtue of his ownership, by the village partners in virtue of their arable holdings, and by the occupiers of certain cottages to which rights were attached. An inquiry into the farming of the lord's demesne land is outside the scope of the present subject. Originally the land had been thrown into the village farm. Its withdrawal from the area of common cultivation was the first breach in the system; but by the middle of the fourteenth century the enclosure of a compact block in individual occupation for the private use of the lord had become very general. Whether it was left in the village farm, or enclosed for private use, it was mainly cultivated by the labour services of the open-field farmers, who paid rent in the form of labour on the demesne for their holdings in the village partnership. The legal and social position of these tenant labourers largely depended on the nature of the services which they thus rendered to their lord. The highest in the social scale were those who gave

team service; the lowest were the manual workers, and the more certain and determinate their labour, the greater their degree of freedom. Of the demesne land nothing further need be said, except that the frequent recurrence of such farm names as Court Farm, Hall Farm, Manor Farm, or Grange Farm, illustrates at once the antiquity and prevalence of such a division of the land.

Isolated farmhouses and buildings were so rare that they may be said not to have existed except on the demesne. Above the tufts of trees which marked the sites of settlements rose the church, the mill, and, at a little distance, the manor house. Gathered in an irregular street were the homes of the villagers who occupied and cultivated the land of the open-field farm. Nearest to the village, if possible along the banks of a stream, lay the meadows. Beyond stretched the open, hedgeless, unenclosed expanse of arable land. Beyond this again ran the common pastures with their fringe of fern or heather, or gorse-clad, bushgrown waste. No part of this area—meadow, ploughland, pasture or waste—was held in individual occupation; all was used in common under regulations as to management by which the whole village community were strictly bound.

The meadowland was annually cut up into lots, and put up for hay. From St. Gregory's Day to Midsummer Day the lots were in this way fenced off for the separate use of individuals. After the hay had been mown and carried, the fences were removed, and the grass became the common pasturage of the live stock of the community until the middle of the following March, when the same process was renewed. Sometimes the meadow lots were attached to the arable holdings, so that the same occupier received the same allotment of grass every year. But the more frequent practice seems to have been to distribute them by an annual ballot among the occupiers of the arable land.

Beyond the meadows lay the arable land of the village, divided into three great fields. Each of the three fields was subdivided into a number of flats or furlongs, separated from each other by unploughed bushgrown balks of varying widths. These flats were in turn cut up into a number of parallel acre, half-acre, or quarter-acre strips, divided from one another by similar, but narrower balks, and coinciding with the arrangement of a ploughed field into ridges and furrows. Year after year, in unvarying succession, the three fields were cropped in a compulsory rotation. One field was under wheat or rye; the

second under barley, oats, beans and peas; the third lay fallow. It is scarcely necessary to add that roots, temporary grasses, and potatoes were unknown to the Middle Ages, and did not come into general use on farms until the latter half of the eighteenth century. Each partner in the village farm held a bundle of strips in each of the three fields. Thus, if his holding was 30 acres, he would every year have ten acres under wheat or rye, ten acres under the other corn crops, and ten acres fallow. No attempt could be made to improve the quality of the soil and bring it up to a general average. Equality could only be secured by distributing the different qualities evenly among the partners. In order to divide the good, medium and poor land fairly, the strips which the partner held in each field were widely scattered so that no two were contiguous. From seed-time to harvest the strips were held in separate occupation for the private use of the individual holder. After harvest, and until the next season's cultivation, the live stock of the community wandered over the fields under the care of the common herdsman, shepherd and swineherd.

There were, therefore, common grazing rights at certain seasons of the year over the whole of the meadow and arable land of the partnership. There was also the common pasture of the manor and village farms which lay beyond the meadows and the arable fields. It was fringed by the border of waste which provided fern or heather for litter and thatching, hurdle-wood, and tree-loppings for winter browsing, furze and turves for fuel, acorns and mast for swine, as well as large timber for fencing, implements or building. For the enjoyment of these lesser common rights to the produce of the waste, small annual payments were often made by the village farmers to the manorial lord. Still more important were the common pastures. When the aftermath of the meadows was gone, and the fallows and stubbles were ploughed, they supplied the only keep for the live stock, which, at the best, barely survived the winter as skin and bone. They were therefore highly prized and jealously guarded by the partners in the village farm as an essential and integral part of their holdings. The modern and popular idea of a common is founded on a misconception. The general public had no share in or claim to its use; on the contrary, they were rigidly excluded. The live stock of strangers were driven off; cottages built upon it were pulled down; commoners who turned out more cattle than they were entitled to were "presented" and fined. Those who enjoyed the

common rights over pasture and waste were known and definite individuals. They were, as has been said, the manorial lord in virtue of his ownership, the partners in the village farm, who in theory were limited in the number of stock which they could turn out, by the size of their arable holdings, and the occupiers of certain cottages to which the rights were attached. To them the pastures were common, and to no one else. The rest of the world were trespassers.

Some of the partners in the village farm were freemen, some were serfs; between the two ends of the scale were men who socially, if not legally, held intermediate positions. Their arable holdings were of different sizes, and were held by a great variety of titles and tenures. A few were freeholders; the great majority were copyholders for lives and, later, of inheritance, leaseholders for lives or for terms of years, tenants from year to year or at will. Equally varied were their rents. Some were held by military service; others by team labour on the lord's demesne; others by manual labour, more or less fixed or uncertain; others paid fixed money rents; others produce rents; others a combination of the two. But the great point was that practically the whole of the inhabitants of the village had some interest in the soil other than that of wages. Few, if any, were landless. Even the serfs had some stake in the community, though in the eye of the law they were propertyless.

The open-field farm was, in many ways, well suited to the times in which it flourished. In the early Middle Ages each agricultural community, with its graduated degrees of dependence and its collective responsibility, was organised, like a trade guild, for mutual help and protection. The organisation supplemented the weakness of the law, which was often powerless to safeguard the rights of individuals. It was also adapted to a disturbed and unsettled period. Communities grouped in villages were safer from attack than if the individuals were isolated in detached farm-houses. Their co-operative principle enabled them to maintain, in spite of the frequent absences of able-bodied men, some degree of continuity of cultivation. Their rigid rules of management may have hindered improvement; but they certainly, as long as the soil remained productive, checked wholesale deterioration. Economically they had not yet become detrimental to the national interest. Towns were few and sparsely inhabited. Except in their immediate neighbourhood, there was little or

no demand for agricultural produce beyond the needs of the producers themselves. If the land fed those who farmed it, it might be said to have done its national duty. No distant markets needed supplies of food. Each village community was self-supporting and self-sufficing. Nothing was expected of the soil except that it should meet the want of the necessaries of life in the locality where it was situated. The inhabitants held little intercourse with their neighbours. Except along the main thoroughfares they had few means of communication. Such local roads as existed were mere drift ways impassable in the winter. Little was either sold or bought. Every group of village farmers grew its own bread supply; its land or its live stock provided its wants of food, drink, fuel or clothing. Agriculture, still in its comparative infancy, was unprogressive. No improved methods or increased resources were offered to farmers, which could only be introduced on open-fields with the consent of a timid and ignorant body of partners, any one of whom could refuse to have them adopted on the farm. The system fostered stagnation, and starved enterprise; but so long as population and farming remained stationary, no definite economic loss counterbalanced its many social advantages. Obviously, however, occasions might arise when the economic loss might be so great as to outweigh the social gain. When such occasions arose, the reconciliation of the two divergent claims presented a very difficult and complex problem. It cannot honestly be said that the wisdom of our legislators found any satisfactory solution. The variety of interests involved, and of rights enjoyed, some capable of legal proof, others originating in encroachments, others existing only by sufferance, required, if they were to be fairly adjusted, most careful discrimination. They sometimes received scant attention, and, under the pressure of economic necessity, the social advantages were unduly sacrificed.

Even in the infancy of farming the agricultural defects inherent in the common cultivation of land by the open-field system are many and obvious. As farming skill advanced, the objections to it became more and more serious. At first, and so long as the virgin soil retained its natural fertility, these defects were mitigated. But their existence was very early recognised by practical men. The waste of arable land was considerable, owing to the innumerable balks and footpaths. Still more serious was the waste of time and labour. The buildings were sometimes as much as two miles from the

holdings. A holder spent hours in visiting his scattered strips, and the toil of tillage operations was enormously increased by the distances between the different parts of his arable land. The distinction between grass and arable was permanent, though both might profit by conversion. All the occupiers were bound by rigid customary rules, compelled to treat all kinds of soil alike, unable to differentiate in their cultivation, bound to the unvarying triennial succession, obliged to keep exact time with one another in sowing and reaping their crops. Each man was at the mercy of his neighbours. The idleness of one might destroy the industry of twenty. If one partner cleaned his strip, his labours might be wasted by the foul condition of the next. Drainage was practically impossible. If one man water-furrowed his land, or scoured his courses, his outfalls might be choked by the apathy or slovenliness of his neighbour. The supply of manure was inadequate. It need scarcely be said that there were no artificials. Natural fertilisers only existed. The value of town refuse, and other substances, were known to the Middle Ages. So also were the uses of marl and lime and chalk. But such fertilisers, if procurable, were often too costly for small open-field farmers. The dung of their live stock was generally their only resource, and it was wasted over the wide expanse of pasture which the cattle traversed in pursuit of food. Unable to supply adequate winter keep, and possessing no separate closes, open-field farmers reared calves and lambs under every disadvantage. Ill-fed all the year round, and half starved in the winter, the live stock dwindled in size. The crowding of the sheep and cattle on the over-stocked and practically unstinted pasture, or in the common-fold on the stubbles, favoured the generation of all kinds of disease. Stock-breeding on improved lines was an impossibility.

The remedy for many of these defects was individual occupation. A freeholder whose land lay in an open-field farm was only half an owner; a leaseholder found the value of his lease similarly reduced. Only on enclosed land, separately occupied, could men secure the full fruit of their enterprise. To some extent the effective and practical working of the system was increased without substantial change in its framework. It very early became a practice to take in closes for various purposes, especially for stocking; or to make temporary or permanent enclosures from the common, which were often under the plough, and formed the "ancient inclosures" of eighteenth century awards; or even to enclose portions of the

common arable land, a practice known as "several in open." These were useful adaptations of the ordinary common-field system. But they scarcely touched the fringe of the most serious difficulty.

The worst feature in the existing system was the inevitable and progressive decline in the productivity of the soil. Land can be continuously cropped for corn if it is kept clean, well-drained and adequately manured. But the arable land of open fields was often foul. The balks harboured twitch; the fallows left their triennial heritage of docks and thistles. The heavy seeding required for crops points to the necessity of preventing the corn from being smothered by weeds. Drainage, with the appliances which mediæval farmers commanded, was always a puzzle, and on the open fields the task was made harder by the difficulty of obtaining agreement among the contiguous occupiers of the intermixed strips. The supply of manure was always inadequate, and what there was did not always go on the land. It is known from writers of the seventeenth and eighteenth centuries that straw and dung were often used for fuel. Triennial fallows were no sufficient substitutes for clean farming, drainage and fertilisers. Much was taken from the soil and little replaced. Strong evidence exists to show that in the fourteenth and fifteenth centuries the arable land, continuously cropped for corn for several hundred years, was losing its fertility. The yield was falling. Land which had produced a livelihood for a man and his family ceased to supply his necessary food. Portions were being abandoned as tillage. There was difficulty in finding tenants before, as well as after, the Black Death. Fines were paid for the privilege of refusing an inheritance in a holding. Tenants were often obtainable only under compulsion. The obvious remedy was to give the arable land a prolonged rest under grass, and to bring the pastures under the plough in substitution. How to effect this necessary change was one of the agricultural problems of our ancestors. So far as the demesne land of the manorial lord was concerned, it could be withdrawn from the open-field farm, and separately cultivated. When Fitzherbert wrote in 1523, that process was practically complete. Some relief was obtained by bringing under the plough new land reclaimed from the forests. In some cases portions of the common pasture were ploughed. In others the partners in the open-field farms were encouraged to agree to exchange and consolidate their holdings, or to take in separate closes out of the arable fields. Thus

pasture made its way into the area hitherto devoted to the plough. None of these remedies, though each entailed enclosure, broke up the framework of the agrarian partnerships. They were rather devices to adapt the old system to changing needs, and were extensively practised in the fourteenth and fifteenth centuries.

Enclosures of these types aroused no storm of criticism. But they did not meet the real difficulty. That difficulty was, as has been said, the falling productivity of the arable land. With this decline the majority of the partners in open fields were, individually and collectively, too poor to grapple. The more substantial men might have met it by agreeing to such a rearrangement of the arable and pasture land as would enable them to lay down the ploughland to grass, and bring the grass under the plough. But their poorer neighbours could not have borne the cost of the readjustment. The decline, therefore, continued, and was accentuated by the effects of social and political changes. The feudal system was breaking up, and labour services were being exchanged for money rents. So feeble was the demand for land that the occupiers were able to drive hard bargains. Substantial men profited by the change; but it was otherwise with those who were less well off. The poorest tenant might pay his rent by work on the lord's lands; but if he had to pay in money, he might have to sacrifice stock, and so set his foot on the slippery slope which leads to destitution.

The long French Wars of the fourteenth and fifteenth centuries, followed by the Wars of the Roses, were not a period when agriculture was likely to thrive. There is direct evidence that farming was actually deteriorating in its methods. Fitzherbert notices that several useful farming practices had fallen into disuse. One is that of marling or liming, the value of which was well known to mediæval farmers at a very early period. His comparative silence on the subject of drainage indirectly points towards the same deterioration. Neither he nor Tusser mention the shallow drains, filled with stones and turfed over, which were familiar to the farmers of the fourteenth century. To the impoverished occupiers the cost of draining or manuring had become prohibitive, and perhaps, in these and other details of management, the relaxation of the minute supervision of manorial officials was telling its tale. Even without this deterioration in farming practices, the loss of fertility was becoming sufficiently serious. If soil exhaustion

continued unchecked, it threatened to become fatal to many of the open-field farms. The weaker men would go to the wall. The men of substance would meet the decline by exchanging their intermixed strips, and consolidating their holdings. This change was in progress. But, with the agricultural resources then available, the most efficient remedy was the conversion, on a large scale, of arable into pasture, and of pasture into arable. It was only with the greatest difficulty that this change could be effected without destroying the framework of the old agrarian partnerships.

At the end of the fifteenth century the enclosing movement, which had been in progress for many years in a piecemeal form, began to reach its height on a more comprehensive scale. It assumed a more drastic form, which was subversive of the village farm and led to depopulation, because it enclosed the open-fields and converted them to pasture. Its effect on the rural population seized on the popular imagination. A considerable literature of protest and denunciation sprang into existence. Commissions were appointed to inquire into and report on the movement; numerous Acts of Parliament were passed to prevent or regulate its progress. The period 1485-1560 is the first of the two great periods of enclosure which form the special subjects of inquiry. The second is roughly covered by the reign of George III, 1760-1820. Both in the sixteenth and in the eighteenth century writers neglected the agricultural side of the movement. Public attention was fastened on its social effects. Popular passion was excited by the preachers, pamphleteers and ballad writers, who denounced, in the racy language of Tudor times, the "greedy gulls," "idle cormorants" and "caterpillars of the commonwealth" who eat up the patrimony of the poor. The same appeals were repeated in the eighteenth century—and since. To a certain extent they were well-founded. Both periods were epochs of great industrial changes, and in both the rural population suffered. If criticism were concentrated on the omission to take every possible step, which was compatible with the national interest, to retain the peasant's hold on the land, the precise form that enclosures generally took could not be justified. On the other hand, changes were necessary. The smaller open-field farmers were sinking into destitution through the decline in the fertility of the soil, combined, as it was at the later period, with the loss of the domestic industries. Admitting that commercial motives came into play to accelerate

enclosures, the real strength of the movement, both in the sixteenth and eighteenth centuries, lay in the national necessity of restoring, maintaining or increasing the productivity of the soil.

With this aspect of the enclosures of 1485-1560 and 1760-1820, a second article will deal in the January issue of this *Journal*.

MILK RECORDING IN ENGLAND AND WALES.

THE practice among dairy farmers of keeping the records of the milk yields of their cows is one to which increasing attention is being given every day. It is impossible to over-estimate the value of this practice. It enables a farmer to weed out cows which are giving little or no return, to carry out feeding on more economical lines, and to detect an ailing cow more quickly than otherwise would be the case. Such records also supply him with data which are of great value in the breeding or selection of dairy cattle, and enhance the selling value of his cows and their progeny. Without the aid of reliable milk records success in breeding or buying heavy milking cows is most uncertain: when a farmer chooses a sire for use in a dairy herd it is equally important that he should have access to authenticated records of the sire's dam and of as many of the sire's female ancestry as possible.

Milk recording in England and Wales, as organised and supervised by the Ministry, is carried on through the medium of local societies of farmers. Cows of any breed, type or cross can be recorded under the Ministry's Scheme, and although the Scheme is not confined to pedigree animals, practically all prominent Breed Societies interested in pedigree cattle urge their members to record the milk yields of their cows under it. Owners of both large and small herds can belong to the same Milk Recording Society, and they enjoy equal privileges. Members subscribe towards the expense of the Society according to the number of cows in their herds, the annual average subscription being about 5s. per cow; the expense, time and labour involved in recording milk yields is small compared with the advantages accruing.

Milk recording—which is part of the Ministry's general Scheme for the Improvement of Live Stock—although still in its infancy, is making good progress. One of the main objects of the Milk Recording Scheme is to ensure that milk records are kept accurately and stated correctly, since the commercial value of records of this kind must depend entirely on the confidence with which traders regard them.

Under this Scheme the Ministry issues official certificates of milk records. These certificates are not merely a statement of the milk yielded, but are a summarised history of the cow for a year. They give, in addition to her milk yield, her age, number

of times she has calved, date of last calving and when due again to calve, the number of days during the year that her milk yield was recorded, the number on which she suckled a calf or calves, and the number during which she was dry. These official certificates, which are issued under conditions which ensure, as far as possible, that the yields and other particulars stated can be relied on as being correct, are of undoubted commercial value, particularly to the vendor and purchaser of certificated cows and their progeny. Cows of good type and constitution, which have also certificated records, invariably fetch higher prices than those without such records.

Farmers, however, do not even yet seem to realise the financial benefits—apart from increasing the production of milk—which result from their joining a Milk Recording Society under the Ministry's Scheme. The advantages of membership are, however, fully borne out by the result of recent sales of non-pedigree cows with certificates of milk records. At one sale 62 non-pedigree cows sold at an average of 104 guineas apiece, and 3 realised over 200 guineas each; at another, 34 cows sold at an average of 88 guineas, 6 fetching over 100 guineas each. At a third sale the average price paid for each cow was 91 guineas, while 9 cows sold at 100 guineas each. At the second sale referred to 67 heifers with certified milk records realised an average of 59 guineas, the highest prices being 210, 170, 150, 130, 123 and 110 guineas. The whole herd realised a total of 6,476 guineas, and as it was valued by a local valuer less than a month before the sale at £3,812, the appreciation of nearly £3,000 (*i.e.*, approximately £32 an animal, including heifers) may fairly be credited to the commercial value of milk record certificates issued by the Ministry under its Scheme.

The Milk Recording Scheme was inaugurated in 1914, but, owing undoubtedly to war conditions, made little progress in its initial stages. During 1916-17, however, 12,950 cows were recorded under the Scheme. The following year the number increased to nearly 20,000; last year to about 38,000; and this year to over 50,000. Even this latter figure is very small in comparison with the total number of dairy cows in England and Wales, and there seems to be no reason why the number of recorded cows should not be doubled or trebled during the next few years, as the advantages of milk recording become better known and appreciated. There are at present 51 Milk Recording Societies operating under the Ministry's Scheme, and fresh societies are being formed and the existing ones expanded gradu-

ally. Societies whose members keep their records in a prescribed manner and follow certain regulations which have been laid down by the Ministry, receive a grant from the Ministry. This grant was, for the past milk-recording year, fixed at £3 10s. per herd for societies which had been operating for not more than two years, and £3 per herd for older societies (subject in each case to the total grant not exceeding one-half of the total expenses of the society for the year). In order to encourage new members to join societies, however, the higher grant of £3 10s. per herd will now be given for two years in respect of each *new member* who joins a milk-recording society for the first time—whether the society be newly-formed or one already established—instead of it being limited to newly-formed societies.

The milk recording year commences on the 1st October of every year. While it is desirable that new members and societies should commence recording on that date, arrangements can usually be made for a start at any time during the year.

The Ministry issues every year, as part of its Milk Recording Scheme, a Register of Dairy Cows. This Register is not confined to pedigree animals. A cow of any breed, type or cross can be entered in this Register, but only if she has been awarded the Ministry's certificate or certificates declaring that she has yielded not less than 8,000 lb. of milk during a milk recording year, or not less than 6,500 lb. of milk on an average of two or more consecutive milk recording years. Entry in the Register is optional, and, at present, free of cost to the cow owner. The main objects of this Register are:—

(1) To assist and encourage in England and Wales the breeding and improvement of dairy cattle of any breed, type or cross by publishing annually particulars of cows which have been proved by certificated milk records to possess high-class dairy qualifications.

(2) To provide authentic records of high-class dairy cattle with a view to bringing sellers and buyers together.

(3) To encourage the keeping of particulars of cows and heifers (including their certified milk record) which in course of time would make it possible to establish a "Register of Cows with Milk Recorded Pedigrees," into which an animal of any breed, type or cross would be admitted, provided that a satisfactory number of its female ancestors possessed satisfactory milk record certificates.

(4) To record particulars of the breeding of cows entered in the Register with a view to encouraging the use of pedigree bulls for grading up non-pedigree herds, so that they may become eligible for recognised herd books in due course.

The first three volumes of this Register for the years ended 1st October, 1917, 1918 and 1919, have already been issued. Volume 3 for the year 1919 contains particulars of 2,320 cows and heifers. Copies can be purchased either direct or through any bookseller from H.M. Stationery Office, Imperial House, Kingsway, London, W.C.2, price 5s. net.

The Ministry has also recently issued model rules for the earmarking and registration of calves bred, and bulls used, by members of Milk Recording Societies. This part of the Scheme is entirely optional on the part of both the societies and their members, but many are adopting it, as they recognise the advantage of having calves and bulls officially marked. In addition to the identification afforded by earmarking, records are kept by the societies of each marked calf, showing the date of its birth, its sire and dam, and also the milk yield of the latter if a certificate has been issued in respect of it. Full particulars are also recorded of the sires of the calves, provided that the former are officially earmarked.

The advantages of joining a Milk Recording Society may be summarised as follows:—

(1) A book and sheets for recording purposes, official certificates of the milk yield of cows, and the entry of recorded cows in the Ministry's Register of Dairy Cows, are, at present, all free of cost to members of societies.

(2) Cows awarded official milk record certificates, and their progeny, usually fetch more money, when sold, than those without such certificates.

(3) Every member receives periodical visits from an officer appointed by his society—known as a "Recorder"—whose duties are to assist members by instructing them or their employees how to keep the milk records, which the Recorder himself checks. The Recorder also earmarks every cow in the herd, by means of tattooing, with a registered number which is a means of identification of the cow for her life.

(4) When a society adopts the Ministry's system of calf-marking a member can also, if he wishes, have his calves earmarked and registered.

(5) Bulk samples of the milk of the herd, if the owner desires, are taken and analysed for butter fat.

(6) The milk of individual cows, provided that their owner pays the cost, can also be sampled and analysed.

(7) Free advice on the feeding and management of a dairy herd can be obtained if desired.

The Ministry has appointed Live Stock Officers, to whom particular districts have been allocated, for the promotion and supervision of schemes for the improvement of live stock. It is one of the duties of these officers to assist members of Milk Recording Societies by giving advice in connection with the breeding and rearing, including methods of feeding, &c., of their stock.

The Ministry will be glad to furnish the name and address of the Live Stock Officer of any particular district on application, and also to supply more detailed particulars of the Milk Recording Scheme to any farmer or association of farmers.

EDUCATION AND RESEARCH IN POULTRY KEEPING.

The following is a summary of the papers read at the Fourth Annual Poultry Conference, held at the Harper Adams Agricultural College from the 10th to the 12th August last. The subjects on the first day were Breeds and Laying Trials, on the second Education and Research, and on the third the Commercial Aspect of the Poultry Industry.

The proceedings on the second day were opened by Mr. P. A. Francis, Technical Head of the Small Live Stock Branch of the Ministry, who read a paper on "Education in Poultry Keeping." A report of this paper was published in the issue of this *Journal* for last month, p. 753.

The Training of Ex-Service Men.—A paper on this subject was read by Mr. F. W. Rhodes, D.S.O., Lecturer in Poultry Husbandry at the Harper Adams Agricultural College. He said that the selection of ex-service men for instruction was no easy matter. In most cases the men had been recommended to take up poultry keeping as a livelihood, and possessed no previous experience. Men late on in years had to begin an entirely new life by learning a business absolutely strange to them, without capital and severely handicapped in health and body. This called for a tremendous amount of pluck and determination, which had not been found wanting. The men were hard-working, willing and keen. Mr. Rhodes suggested that a course of instruction might be arranged as follows:—

(1) There must be thorough practical instruction and continued practice in all the everyday work of the poultry man. Whenever possible, responsibility should be placed on the shoulders of the individual, as this encourages the person to take an interest in the birds and unconsciously develops one of the most important faculties to success, namely, the power of observation. It is the small things that the experienced eye notices which matter in poultry keeping.

(2) Instruction in hatching and rearing should be as extensive as possible. For the ex-service man the necessity is for instruction and practice in natural hatching and rearing, as he would be unable to bear the expense of incubators and brooders.

(3) The selection of breeding stock and culling by means of external characters form an important part of the training. Whenever possible demonstrations should be given in preference to lectures pure and simple.

(4) Training in rough carpentry on economical lines is

essential. Chicken coops, grit hoppers, food troughs, and other articles of equipment can be made from packing cases, while laying houses may also be built by the poultry keeper himself.

(5) The theory underlying practical work should be dealt with, since it is always easier to do a job properly when the reason of the method is understood.

(6) A knowledge of the early symptoms of common diseases is essential, and, what is even more important, a knowledge of the best methods of prevention of disease and infection. The treatment of diseases is not so important, as the average poultry keeper has not the time to apply the knowledge he may acquire. Unless the bird is a valuable one, it is better to kill it at once.

(7) Apart from poultry keeping, the ex-service man should know something of fruit and vegetable growing. Horticulture and poultry keeping can undoubtedly be worked successfully side by side. Pigs and bees are also subjects that should be understood by the ex-service poultry keeper.

(8) Some knowledge of chemistry, so far as it applies to foodstuffs, and the uses made by the body of the various food constituents, should also be taught.

The benefit the men receive from instruction depends very largely on the way in which the instruction is given. The instructor should know and understand his pupils, and he should be trained in the art of instructing.

Poultry Education in America.—This subject was dealt with by Mr. Edward Brown, F.L.S. In his preliminary remarks he mentioned that the first centre of organised poultry teaching was formed at Gambais, France, about the year 1893; the second at Reading, England, in 1895; and the third at Kingston, Rhode Island, U.S.A., in 1896. The position to-day is that France has made practically no advance; that Great Britain has made considerable progress in elementary poultry keeping, but that higher education has been neglected; while that in the United States and Canada remarkable progress has been made.

Forty-eight of the State Colleges of Agriculture in America have Departments of Poultry Husbandry, with well-trained staffs of teachers and investigators, and plants for teaching and experimental work. In Canada poultry instruction and investigation are undertaken on broad lines in nearly every province. As a result, the United States, with a population little more than double that of the United Kingdom, records an annual production of eggs and poultry equal in value to £250,000,000 as against £53,000,000 in the British Isles, or, *pro rata* to the population, nearly 100 per cent. greater.

Recognising the importance of experimental work and research, about thirty years ago the United States Government made large annual grants which have since been greatly increased. These have been the basis for all developments which have taken place. It was not until the experimental work had been developed that poultry teaching was introduced.

Gradually such investigations have been extended, some over several years, as those on fecundity, by Dr. Raymond Pearl, at Orono, Maine; on breeding, by Professor James Dryden, at Corvallis, Oregon; on heredity, by Dr. Leon Cole, at Madison, Wisconsin; and on diseases, by Dr. Philip Hadley, at Kingston, Rhode Island. Experimental work has formed the basis of all instruction. Without the well thought out investigational work which has been conducted at the Colleges and Experimental Stations, poultry husbandry in America would not hold the high place it occupies to-day.

A well trained and efficient staff of instructors is essential. This need was early recognised in America, and the country now possesses a fine body of instructors and investigators. In the various Colleges and Farm Schools poultry teachers are accorded the same status as their colleagues.

At Cornell, N.Y., the staff of the Department of Poultry Husbandry, apart from office assistants, consists of fifteen members, each of whom undertakes a specific branch of work. Eighty acres of land are allotted for poultry work at the University. The land is divided into two sections: (1) for demonstration work, and (2) for experimental work.

The courses of instruction include both the science and practice of the industry, and also subjects related to animal husbandry. Education is not restricted to students who attend courses. No fees are charged to students who are residents of the respective States, but students are required to support themselves.

Assistance is given to farmers in various ways. Mr. Brown mentioned the following:—

(1) By the issue of Bulletins. These are sent out broadcast, one Experimental Station having a mailing list of 180,000.

(2) By extension work. Members of the staff spend most of their time visiting those engaged in the business of production. It is in this way that such processes as systematic culling are generally introduced.

(3) By encouraging producers to keep in contact with the Colleges, to submit difficulties as they arise, and to avail themselves of the experience of the College specialists.

(4) By annual " farmers' weeks " and poultry conferences. State and county poultry surveys have also been undertaken, and by means of *questionaires* and personal inquiries much authoritative statistical information has been collected.

Summarising his remarks, Mr. Brown stated that the great Colleges of Agriculture give to the subject of poultry keeping a status in the curriculum equal with other subjects. All Authorities realise that instruction and investigation are closely interrelated, and make liberal grants in both these directions. The staff engaged is adequately remunerated, but a high standard of qualification and experience is demanded. While poultry keeping in its higher branches has been starved in this country, it has been liberally supported in America.

Poultry Research.—Professor Charnock Bradley, M.D., D.Sc., F.R.C.V.S., dealt with the question of poultry research. He said that in the discussion and justification of research two main questions demand answers: (1) Is research worth while? and (2) Is it necessary?

The first turns upon the commercial significance of the industry. An accurate estimate of the world population of poultry is impossible, but an imperfect idea of the importance of the poultry industry in civilised communities can be formed. The country with the largest poultry population is the United States of America. In 1910, on 5,578,528 farms there were 290,350,000 fowls, 3,688,000 turkeys, 2,906,000 ducks, 4,431,000 geese, 1,765,000 guinea fowls, 2,730,000 pigeons, 6,458 pea fowls and 5,361 ostriches. At that time the total value of these birds was £36,000,000, and their value would be much greater now. The figures refer only to poultry kept on farms. In Great Britain such high figures cannot be reached, but information available for poultry on holdings on 4th June, 1908, shows that there were in this country 32,356,000 fowls, 2,963,000 ducks, 712,000 geese, 697,000 turkeys. The number of fowls is now very much greater than it was in 1908.

No figures are available for Continental countries, but their absence is not of vital moment. The importance of poultry as a national asset is recognised in every civilised country, and it cannot be denied that there is a constant and serious loss from disease. Clearly then, if research will diminish this loss, it is abundantly worth while. If research did no more than add the equivalent of but one egg to the annual total of every laying hen in the Kingdom it would add at least £250,000 to the revenue of the nation.

If we turn from statistics to what has actually been done, there is just as convincing an answer respecting the justification of research on the ground of its utility. Research has already thrown much light on obscure diseases, notably in the case of bacillary white diarrhœa. This disease is acknowledged to be caused by a specific micro-organism, and is more than commonly dangerous. A healthy hen may not only transmit it to her chicks, but be the means of infecting healthy premises. One of the triumphs of poultry research has been the discovery that a chick that has recovered from the disease may retain the virus in its system. Later, in the pullet, the ovary may become infected, and the virus handed on in the eggs. It is fortunate that many of such eggs fail to hatch, as if an infected egg hatches, the chick suffers from the disease and transmits it to other chicks.

Research has been principally concerned with the discovery of the cause of disease in order that it may be eliminated. Curative measures, however, have not been neglected, although these, unless applicable in bulk, are not likely to appeal to the poultry owner, except in the case of valuable birds.

Turning to the second question: Is research necessary? an affirmative is not difficult to support. There is no poultry keeper who has not met with cases of disease that could not be labelled with a familiar name. The pathologist freely confesses that he is frequently at a loss to supply a diagnosis. If there are difficult problems still unsolved in mammalian pathology, it is readily understood that there are many more in the much fresher field of avian pathology.

The lecturer mentioned a number of little-known diseases. What is the œdema of the wattles occurring in Australia, the disease recorded by Mazza in Upper Italy, and the semblance of fowl cholera, but apparently caused by a larger organism? What is the cause of fowl plague? Is the so-called avian diphtheria one disease or many? These questions are not purely academic. He would be a rash person who would venture to assert that their answers can be of no practical utility.

Again, there are many diseases that have apparently been reported only once. In these cases it is in the highest degree unlikely that a particular disease has suddenly appeared and then as suddenly disappeared. It is much more probable that it is one of those unidentified diseases met with almost every day.

The relation of parasites to disease also offers a fruitful field for inquiry. Much is known, but this section of parasitology

is not exhausted. Much less is known, however, of the effect of parasitism as contributing to or even initiating disease. Dr. Bradley referred to an interesting investigation which has been concluded by Theobald Smith, into Entero-hepatitis or "black-head" of turkeys.

Though research should be mainly concerned with disease, there are other abnormal conditions that offer a profitable field for investigation. Physiology, particularly the physiology of digestion and nutrition, and the laws of heredity, were mentioned as subjects in which research is needed.

Research in Incubation.—Mr. Tom Newman, in his paper on Research in Incubation, said that the dead-in-shell problem remained much as it was 10 years ago. It is probable that other factors apart from incubation were partly responsible, but the immediate problem was the hatchable egg that did not hatch. No solution could be offered, but if dead-in-shell could be reduced by 10 per cent. an enormous saving would result.

The structure of the egg should be understood. First there was the shell, consisting of calcium carbonate or lime, with just a trace of inorganic materials. The shell is porous, and slow evaporation takes place, while, during the growth of the embryo, carbon-dioxide escapes and oxygen is taken up. Observations have been made on the loss of weight during incubation, and conclusions have been drawn indicating that brown-shelled eggs, which are less porous and of a closer texture than white, are more difficult to hatch. Inside the shell are two membranes: one remains in close contact with the shell, while the inner membrane, following the shrinking of the contents, usually separates from the outer membrane at the large end, forming the air cell. These membranes permit gases to pass through them when moist, but if dry become impermeable.

Graham incubated eggs for one week under hens and finished the hatch in incubators, and also incubated the first week in incubators and finished under hens.

Those started under hens gave satisfactory results, but the other group showed no improvement as compared with eggs incubated artificially during the whole period. Here the problem can be narrowed down to one of temperature. It does not seem that moisture on the intake of oxygen materially affects the development of the embryo. Under a hen the eggs are warmed by being in direct contact with the source of heat. The temperature of an incubator is not evenly distributed, and it may be that during the first few days a number of germs are weakened by insufficient heat. The variation, between the centre and

sides of the egg tray, is in some machines as much as 4° to 6° Fahrenheit. Covalt found that the inside temperature of eggs under a hen at three, six, and twenty-four hours was 100° F., and the end of a week 101° F. When a thermometer was hanging on a hook in the incubator the inside temperature of the egg was only 97°, or 3° less than under the hen.

It would appear from this that the best temperature would be 102° F. during the first week with the thermometer lying on the egg, and from then 103° F. until the eggs begin to hatch.

With regard to turning eggs, frequent turnings seem to give the best results.

Correct ventilation is of great importance. In an incubator the carbon-dioxide must be removed or kept below a certain maximum. The carbon-dioxide thrown off varies with the vigour of the embryos. The amount present is important, as if excessive it interferes with the proper intake of oxygen; on the other hand, if the incubators are over-ventilated the membranes of the egg dry down too rapidly, the carbon-dioxide evolved by the embryo does not escape, and the egg is smothered. This explains the greater difficulty in hatching brown eggs in incubators. Under a hen there is a very much greater quantity of this gas than in an incubator, but the gas is largely given off by the hen herself. The ideal seems to be to keep the air in the incubator as pure as possible without allowing it to become too dry. It has been suggested that slacked lime might be kept in the moisture tray instead of water. In this case the lime should be kept fairly wet, as it would have a greater evaporation surface than water. If we can obtain a pure atmosphere without excessive ventilation the big loss occurring from the eighteenth to the twentieth day might be avoided. Deaths during this period are probably due to the fact that insufficient carbon-dioxide is evolved, owing to the drying down of the membranes in the efforts to obtain extra ventilation.

Experiments have shown that better results are obtained where no cooling is practised. Storage of eggs for incubation is also a matter of importance.

The Universities and the Poultry Industry.—A paper on the Universities and the Poultry Industry was contributed by Mr. F. W. Parton, Lecturer in Poultry Husbandry at the Leeds University. The view of Mr. Parton was that the Universities should be the centres to which all living within their area could apply in respect to all questions of difficulty. On the scientific staffs there should be men who could undertake investigational work in all poultry problems, as required.

DISTRIBUTION OF SITTINGS OF EGGS AND DAY-OLD CHICKS.

NOTES have appeared at various times in this *Journal* explaining the Scheme of the Ministry for the distribution of sittings of eggs and day-old chicks to small holders and cottagers. The Scheme was instituted in 1916 as a war measure, in order to effect a rapid improvement in the strains of poultry stock of this country. It was hoped that the facilities afforded for the purchase of eggs and chicks would encourage many people to use better stock and be a means of relieving the growing shortage of eggs due to the decline in the import trade.

Owing to the scarcity of feeding stuffs during the later years of the War, in consequence of an active Submarine Campaign, a general reduction in the poultry stocks of the country became necessary, and the Scheme was curtailed considerably in 1918 and 1919. The Stations, however, had proved their value, and steps were accordingly taken at the conclusion of the 1919 season for the Scheme to become part of the ordinary work of the County Committees for Agricultural Education, through which it has since been administered locally.

In the season 1920, therefore, the responsibility for undertaking distribution rested upon County Committees to a greater extent than hitherto, but in order to maintain some uniformity in working throughout the country, the Ministry circulated detailed suggestions as to the setting up of Schemes, for the guidance of Committees. Greater liberty was given to the Committees in local arrangements, but it was required that the County Schemes should be submitted to the Ministry for final sanction. No Scheme could be undertaken unless an Instructor in Poultry Keeping were employed, who could be held responsible for the supervision of the distributing stations and assist generally in carrying out the Scheme.

General Outline of the Scheme of Distribution.—Sittings of eggs and day-old chicks are supplied at a fixed price within a

* Particulars of the Scheme and of the Incubating Stations were published in this *Journal*, April, 1916, p. 72, and October, 1916, pp. 685 and 702, and accounts of the working of the Scheme in the issues for December, 1918, p. 1106, and February, 1920, p. 1227.

county. The supply is mainly intended for small holders and cottagers, but distribution may be extended to other persons engaged in rural pursuits.

Breeders of pure bred poultry resident in the county are appointed as Stationholders annually, to distribute from selected stock to applicants within the county areas. In addition to the price paid for eggs or chicks, the Stationholder receives from the Local Authority at the end of the season a small subsidy per dozen eggs and chicks sold. Stationholders are selected by the Local Authorities, following a preliminary inspection of stations, but the sanction of the Ministry to the appointments is required. The County Instructor is responsible for selecting and approving the birds from which distribution is permitted, and for the regular supervision of the work of the Station.

Applications for a supply of eggs or chicks may be forwarded either to the Agricultural Organiser for the county or to a Stationholder direct. Under the conditions of the Scheme no applicant is permitted to receive more than 4 dozen hen eggs, 4 dozen duck eggs, and 2 dozen chicks; in some counties a lower maximum is fixed.

Full details of the Scheme in each county are issued in the form of a leaflet, and particulars are advertised by County Council.

Distribution in 1920.—Distribution of eggs began on 15th January and of chicks on 15th February, and concluded on 15th May in the case of eggs and 31st May in the case of chicks. The largest demand occurred from March onwards, the majority of applicants being dependant on natural methods for hatching and rearing.

Although the total number of Stations had been augmented only by 12 over last season, considerably more eggs and chickens were distributed. The number of sittings of eggs supplied has nearly trebled, while the supply of chicks has increased sevenfold. This improvement is no doubt due in some measure to the removal of the restriction limiting the supply from individual Stations and to the extended facilities provided for the distribution of chicks, but it may also be attributed to a growing appreciation by poultry keepers of the benefits of the Scheme.

The figures in the following tables will enable an estimate to be formed of the work of the Stations during the season 1920:—

TABLE I.—*Counties and Number of Stations.*

Counties.	*No. of Stations.*	*Counties.*	*No. of Stations.*
ENGLAND.		Nottingham	3
Berkshire	4	Staffordshire	5
Buckingham	6	Surrey	4
Chester	5	Sussex (East)	4
Cumberland and Westmorland...	4	Suffolk (East)	4
Cornwall	5	Shropshire	4
Derby	2	Warwick	2
Dorset	1	Wiltshire	7
Durham	4	Worcester	2
Gloucester	4	Yorkshire	26
Hampshire	4	WALES.	
Hereford	3	Anglesey	5
Hertford	1	Brecon and Radnor	3
Kent	7	Cardigan	1
Leicester	5	Carmarthen	6
Lincolnshire (Kesteven)... ...	6	Carnarvon	2
„ (Lindsey)	7	Denbigh and Flint	7
Norfolk	2	Montgomery	2
Northampton	4	Monmouth	2
Northumberland	2	Pembroke	3

TABLE II.—*Number of Stations.*

Egg Stations.	*Combined Egg and Chick Stations.*	*Chick Stations.*	*Total.*
121	39	8	168

TABLE III.—*Number of Eggs and Chicks Distributed.*

Eggs.		*Chicks.*		*Total.*	
Cottagers and Small holders.	*Others.*	*Cottagers and Small holders.*	*Others.*	*Eggs.*	*Chicks.*
118,328	23,283	20,201	733	141,611	20,934

TABLE IV.—*Prices to Applicants and Premiums to Stationholders.*

Price per Doz.		*Premium per Doz.*	
Eggs.	*Chicks.*	*Eggs.*	*Chicks.*
5/6 to 7/6	12/- to 15/-	1/- to 3/-	4/- to 5/-

It will be seen from Table I that only a few Stations have been established in some counties, and that there is considerable scope for the Scheme to be extended.

Some of the most backward areas with regard to the keeping of poultry upon modern commercial lines are least well served with Stations; instances are Northumberland and Dorset. In Somerset the Scheme has not been taken up, while in Wales there is considerable need for development. Carnarvon and Cardigan, two important counties, are poorly served, and the Scheme has not been taken up in Merioneth and Glamorgan.

It will be noticed from Table III that the type of poultry keepers who most require encouragement, namely, small holders and cottagers, are receiving first attention. The demand for day-old chicks is far more difficult to meet than that for sittings

of eggs, but there is evidence that an increased effort is being made in many counties to cope with the demand.

The prices of eggs and chicks and the subsidies to Station-holders were fixed by the County Committees, and varied in different counties. The highest and lowest prices charged are stated in Table IV. The majority of the counties distributed sittings at the minimum figure, and except in a few instances the premium paid was 2s. The general price for chicks was 15s. with a premium of 5s.

In previous years a flat rate over the whole county was fixed by the Ministry, but owing to the varying values in different areas this did not prove altogether satisfactory. A price suitable in the more progressive counties often proved too high in backward areas, where education in the value of keeping better quality poultry has not been widely diffused.

An important result of the Scheme has been the greater attention given to the fact that the services of an Instructor in Poultry Keeping, appointed by the County Council, are available for those who require advice on the management of poultry. The possession of poultry of better quality leads to the desire for knowledge of better methods of management, and many poultry keepers are glad to take advantage of the services of the Instructor in an advisory capacity.

The effect of the Scheme, therefore, has been, not only to increase the numbers and improve the quality of poultry kept throughout the country but also, by the encouragement given to better methods of management, to increase production and give larger financial returns.

It is optional on the part of Local Authorities to put this Scheme into operation, but where adopted the Ministry has contributed two-thirds of the approved expenditure by the Local Authorities on the Scheme.

THE NATIONAL FEDERATION OF WOMEN'S INSTITUTES.

M. Frida Hartley.

The Ministry of Agriculture has recently given to the National Federation of Women's Institutes convincing evidence of the support promised at the time of the severance of the latter from the Women's Branch of the Ministry. A "School" or fortnight's free tuition, the first of its kind, has been provided, with board and lodging, to 20 of the County Organisers whose names had been submitted to the Ministry through the Local Federations. The tuition took the form of lectures and practical demonstrations, at two centres, the first being held in the School of Rural Economy, Oxford, and the second at the University of Aberystwyth. The representatives of the County Federations were unanimous in their appreciation of the way in which the subjects chosen built upon their own established experience and demonstrated the wide possibilities for stimulating village life.

The first Women's Institute was formed in 1915, and from that time onwards the movement has met a clearly defined need and has had a clearly defined purpose. Throughout the latter end of the 19th century the rural population in England had been steadily diminishing. The industrial revolution had turned the tide of interest to manufacture and trade, and at the same time, owing to the influx of manufactured goods, was robbing the badly paid labourer of the additional earnings gained by such handicrafts as spinning and weaving, lace making and basket-making. As the century wore on and trades unions began to make their mark, wages had increased somewhat and trade had begun to spread into the country towns. Markets had begun to improve and were more regularly attended, and roads were placed under the control of Highway Boards. The Education Act of 1838 had relieved children to a great extent from the martyrdom endured during the first period of the industrial revolution, and though the effects of that almost incredible period were not to be wiped out in a single generation, the Act was the dawn of a new era of civilisation. At the beginning of the 20th century County Councils had been provided with facilities for secondary or "technical" education, but in the smaller villages at any rate the opportunities for following this out to a practical issue were small. Clubs and reading rooms had been inaugurated, but attendance in many places was

small owing to the monotony of a purely local environment. Hence, in spite of the efforts of pioneers, the stultifying effect of the sensation of detachment was giving way to the craving for a closer connection with the centres of industry, trade and social interest.

The forerunners of the Federation of Women's Institutes were men and women who had wrestled, sometimes single-handed, to open out village life, to find scope for tentative energies and to turn them into practical achievements. They had long realised wherein lay the difficulties of their task. They had seen that the obstacles which so often prevented local attempts at organisation from becoming abortive were not actually lack of imagination and a vague desire for growth on the part of the villagers, but were rather the dire need of a more comprehensive organisation which could link effort to effort, and give them the significance of co-operation. They knew that it must in some way be possible to re-awaken neglected industries inherited by individual women and individual villages from generations back, adapt them to modern requirements and turn them into marketable produce. They knew also that there was latent talent to be developed into adequate means of self-expression for the satisfaction of the owner and for the good pleasure of the community, but only too often the interest aroused perished for lack of a breath of outside encouragement and the stimulus of wide competition. Drawbacks such as poor roads and bad train service, the distance of many villages from their market towns, the shortage of good rooms and halls for exhibitions or entertainments (and the lack of funds to hire these), made the task of local organisers yet more difficult. In some of the villages, therefore, such industries as had begun to flourish were discontinued because the market value was not sufficiently established to admit of the purchase of fresh material.

In many villages yearly fruit and vegetable shows, at which were also exhibited dairy produce and needlework, had become regular and prosperous institutions even before the advent of the Women's Institute Federation, but in other places the anticipated development did not mature. In these cases failure was due to the monotony of a purely local standard of exhibits and to the fact that technical interest was not sufficiently developed to induce perseverance or the spirit of legitimate competition. Then a remedy came.

At the end of the 19th century a small body of women who were anxious to develop country life in Canada had organised

a movement known as the "Women's Institutes." At the start it had aimed at little more than a series of social meetings and a remedy for the loneliness of farm and district life. As time went on, however, the educative and economic side of the scheme reached a stage at which it had received helpful recognition from Provincial Government Departments and occasionally from the Colleges. One of the most remarkable features of the history of the Women's Institutes movement is, that its rapid growth was due not to the result of propaganda but to the actual spontaneity of interest which the movement awakened. It came as a boon to isolated Canadian homes and farmsteads, and the organisers began to realise that the scheme might well become a world-wide one. It soon spread to the United States; the Belgians adapted it to their own needs; and in 1915 Mrs. Watt, Organiser for British Columbia, came over to Wales, and under the auspices of the Agricultural Organisation Society started the Institute which was destined to be a great success in itself and also to be the forerunner of the whole movement in this country.

The constitution of the National Federation of Women's Institutes may be given somewhat as follows:—

> Unity of purpose to be ensured by the laying down of general principles and procedure of the movement as a whole.
>
> The National Federation to consist of properly qualified and approved Women's Institutes and County Federations that have made application for membership in accordance with the rules and regulations that may from time to time be approved by the Executive Committee on behalf of the National Federation.
>
> The administration of the work of the National Federation to be vested in:—
>
> *A General Meeting* constituted of one delegate from each Women's Institute, three delegates from each County Federation, six representatives appointed by the North Wales Union of Women's Institutes, and three Members of the Executive Committee:
>
> *The Executive Committee*, on which are appointed three members nominated by the Ministry of Agriculture, one member by the Board of Education, two by the Agricultural Organisation Society, one by the National Union of Women Workers and 15 members elected at the General Meeting.

So clearly did the National Federation of Women's Institutes meet a need that no doubts could be entertained of its ultimate success in this country. In many villages the Organisers doubtless had need of much patience and reiterated inspiration to destroy a phlegmatic outlook in minds which had grown rusty by disuse. A new conception of democracy and of the communal life had to be developed in villages where the remains of a feudal

system had reigned for many years, but the new workers were full of the enthusiasm of past success. It was theirs to awake the feeling of sisterhood and partnership amongst women of all classes, by the living bond of communicated knowledge and shared technical interests—a re-awakening in fact of the ideals of the mediæval guilds of craftsmanship. Those who had toiled for years in remote villages now realised how far-reaching was the result of the scheme.

Whilst the movement was still in its infancy the Ministry of Agriculture (in October, 1917) decided that its organisation belonged rather to the Women's Branch of the Ministry than to the Agricultural Organisation Society, and action was taken accordingly. This was done for emergency purposes and for a better centralisation of the work of food production in which the Federation played so important a part. During this connection of two years, the work made rapid growth, the number of Institutes increasing from 130 to 1,100.

In April, 1919, however, when the Women's Branch as a War Department was no longer required, it was decided to leave to the Federation its full self-governing powers, with responsibility for its own propaganda and after-care. It was realised that there would be greater elasticity and scope for originality on the part of County Federations than could be enjoyed under a Government Department in normal times. Nevertheless, the promise was conveyed by Dame Meriel Talbot as Delegate of the Ministry to the Meeting of Representatives of the Women's Institutes in April, 1919, that the Federation was by no manner of means to consider itself as cut off from Government support and Government interest, but that on the contrary every assistance would be given in future in expert advice (a very valuable asset), in the Ministry's Schools for Institute Organisers, and in the recommendation at the time of a grant from the Development Commission. Since that time the Federation has been in the position of a self-governing voluntary institution, with full powers to adapt its methods to the individual needs of the district it serves, but with a strong background of Government interest and support. As such it started on its work anew.

The fortnight's "Schools" for Organisers were a fulfilment of the Ministry's promise, and as the lecturers were University experts whose services had been engaged by the Ministry, a threefold interest has been created owing to the fact that it formed a link between a Government Department, the University and a Voluntary Organisation.

The subjects of the lectures were very varied and were so chosen as to cover practically the whole ground of the Federation's activity, and to add to it a new field of technical and historical interest. The principal Lecturers were Mr. Ashby (Lecturer in the Institute for Research in Agricultural Economics), Mr. C. G. T. Morrison (University Lecturer in Agricultural Chemistry), Mr. C. S. Orwin, M.A. (Director of the Institute for Research in Agricultural Economics), Mr. Ley (Organist of Christ Church Cathedral), Dr. Lund, Mr. Cecil Sharpe, Miss Hadow, and Miss Avice Trench.

Mr. Ashby dealt with Outlines of Rural Development, Mr. Orwin with Local Government and Administration, Miss Hadow with the principles of Organisation from its theoretical and practical sides, and as applied to the efforts of the Federation, and Mr. C. G. T. Morrison with Agricultural Life in its Relation to the Community.

These and other lectures were followed by discussions during which a lively questioning of the Lecturers by members of the audience showed that the latter were well able to bring their practical experience to bear upon the subjects dealt with!

The School at Oxford was followed by another of the same kind at Aberystwyth, and both mark the cordial interest of the Ministry of Agriculture in the growing work of the National Federation. The work of the Federation cannot fail to grow because it comes to meet so great a need. Dame Meriel Talbot struck the keynote of the great spirit of the old guilds of craftsmanship with their aim of a common brotherhood when she pointed out that only through the love and knowledge of the humble things of life a living idealism can be attained. The ideals of the Federation are live ideals because they strive to teach a restless generation that in a desultory search for pleasure or power a man or woman may gain all and yet possess nothing.

THE DISTRIBUTION OF WART DISEASE.

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In the first part of this article, published in last month's issue, an account was given of the possible origin of wart disease, the earliest traces of the disease in this country, and its spread in recent years.

Influence of Disease on the Varieties grown.—In dealing with a disease which is only virulent on certain varieties of potatoes, it can be readily seen that the variety of potato commonly grown at certain periods would influence enormously the rate of spread of the disease. Early varieties at any time apparently exercise but little influence on the spread of the disease, so that only second earlies and maincrop will here be mentioned. The table below gives a list of those potatoes which have been extensively grown in this country since 1850, together with the approximate date of the introduction of the variety to commerce. It must be remembered that the varieties would take some five or six years to establish themselves, so that their influence would not be apparent until some ten years or so after the date given.

Variety.	*Date of Introduction.*
Victoria	1850
Regents	1852
Champion	1867
Magnum Bonum	1876
Maincrop	1882
Abundance	1886
Bruce	1887
Up-to-Date	1893
British Queen	1894
President	1901
King Edward	1902
Great Scot	1911
Arran Chief	1912

There is no reliable evidence to show that Wart Disease existed in this country in the days of the varieties Victoria, Regents and Magnum Bonum, nor do we know whether Victoria was susceptible to, or immune from, Wart Disease,

* Report of a paper read before the British Association for the Advancement of Science, at Cardiff, on 24th August, 1920.

or whether the two late varieties were susceptible. Champion, Abundance and Maincrop, which were extensively grown after the Regents were given up, were all immune, so that in any case, had the disease existed at this period, little damage would have been caused. About 1877 Mr. Archibald Findlay, of Fife, commenced raising new varieties of potatoes. Working on new lines he endeavoured to breed varieties resistant to "Blight" (*Phytophthora infestans*), and did yeoman service to the potato industry of this country by introducing to it such magnificent cropping new varieties as the Bruce in 1887, Up-to-Date in 1893, and British Queen in 1894. These varieties of potatoes possessed just those qualities that the previous ones had lacked, viz., good shape, colour, quality, and a great cropping capacity, so that after a very few years—from about 1900 onwards—British Queen and Up-to-Date became the varieties popularly grown. Incidentally, these varieties were susceptible to Wart Disease, and it is probable that the disease, which had appeared just prior to this time, finding suitable host plants, firmly established itself during this period.

President and King Edward were introduced to the potato industry soon after 1900, and, being susceptible, these varieties in no way tended to check the disease. Arran Chief, on introduction into Scotland about 1912, was immediately taken up by growers and largely grown. This variety has been for several years one of the most susceptible varieties in existence, and the rapid spread of the disease in recent times must be attributed to the widespread growing of this variety. In so far as reliance can be placed on official statistics, the fact that 66 per cent. of the cases of Wart Disease occurring in England were on Arran Chief gives support to the above statement.

During the 'nineties, our British potato breeders were endeavouring to produce varieties resistant to the destructive "blight" (*Phytophthora infestans*), and to a large measure they succeeded, but at the same time the industry was presented with varieties highly susceptible to Wart Disease. Their newer problem since 1908 has been Wart Disease, and the majority of breeders are now working to produce immune varieties. So far as Second Earlies and Maincrop are concerned, they have met with considerable success, and in a few years the potato crop will be comparatively safe from this disease.

Mr. Findlay, of "Up-to-Date" fame, has now introduced the Immune Majestic; Mr. McKelvie, the producer of Arran Chief, has given us Arran Rose, Ally, and Arran Comrade;

Ezra Miles, an old breeder near Leicester (although now living in the North of England), produced seeds which ultimately gave the industry Great Scot, King George, Lochar, Tinwald Perfection, and Rhoderic Dhu.

Influence of Distribution of Seed Potatoes.—It now becomes necessary to consider the way in which these potatoes became distributed throughout the country. In these days potato growers in England and Wales look to Scotland and Ireland for their seed, and rely on the railway companies to make the transport of the goods as convenient and as cheap as possible. Needless to say, such a state of affairs has only been arrived at by stages, each stage possibly having an important bearing on this subject.

As far back as the middle of the nineteenth century potato growers in England and Ireland procured seed potatoes in small quantities from Scotland, but there is a general opinion among merchants that prior to 1895 the transference of seed, which was only on a small scale, was more or less confined to the early varieties.

About 1895, owing to the energies of Mr. Archibald Findlay in breeding potatoes on his farms in Fife and growing a crop of potatoes produced from Scotch seed on his farms in Lincolnshire, and also as a result of the potato trials of Mr. Tom Scarlett of Edinburgh, the demand for seed from Scotland increased.

In 1900 "Blight," sweeping through the Eastern Counties, destroyed a very large number of the commoner varieties then grown, but one of two Scotch varieties raised by Mr. Findlay remained clean. A potato boom was created which increased the importance of these varieties, and the fact that they were Scotch varieties stimulated the Scotch seed potato industry, so that from 1900 onwards the transference of seed potatoes from Scotland for planting in England steadily increased year by year.

Transport and Distribution of Disease.—The simplest and probably the best method of sending seed potatoes is by rail, and this method is probably the least costly for short journeys, but prior to 1914 transit by sea for longer journeys was cheaper. English buyers naturally choose to obtain their seed from districts where the ultimate cost to them would be the least. Thus the southern potato districts of Scotland, Fife, the Lothians and Dumfries were selected for preference. Merchants trading in seed potatoes grown in the more northern districts of Scotland were, consequently, at a disadvantage. They could only market their produce at a lower price than the southern merchant, or choose a less costly method of transit. Transit by shipment, as

previously stated, was cheaper than by rail for long distances *only*. The northern merchants were therefore compelled to adopt this method of transport to secure trade, and, for financial reasons, to choose districts in England fairly remote from Scotland, where shipping ports existed.

Thus the southern merchants of Scotland captured the trade in the North and Midlands of England, with the result that the bulk of the seed sent to, and grown in, Lancashire and the Midland parts of England was derived from the Lowlands of Scotland (Fife, East, West, and Mid Lothian, Glasgow, and Dumfries).

The merchants of the North founded good shipping routes between the East Coast ports of Scotland—Dundee, Montrose and and Arbroath—and the Wash ports, London, and in lesser degree Grimsby, and in this way soon captured the trade in South Yorkshire, Lincolnshire, the Eastern Counties, and Kent. Another shipping line was established between Ballintore (in Ross) and Portsmouth and Southampton, so that the bulk of the seed sent to Hampshire and Sussex was obtained from the furthermost potato county of Scotland (Ross).

Lincolnshire and Lancashire have also from early days produced large quantities of seed potatoes. Those despatched from Lincolnshire were sent to the Southern and South Western Counties, while Lancashire sent much into South Wales and the industrial parts of the Midlands.

From the preceding facts the inference must be drawn that the disease has been distributed with the seed potatoes sent out by rail from the infected parts of South Scotland to the North of England generally, subsidiary infection of the Midlands, North and South Wales having taken place at a more recent date from seed supplied from Lancashire and Cheshire. The concentration of the disease in the North West, the Midlands, and South Wales has been due more to considerations of transport than to influences of soil, or to the fault of the miner with his allotment garden, as has hitherto been believed by many. As very little transference of seed potatoes takes place in a northerly direction, the disease in the South of Scotland has not reached the northern potato areas of Perth, Forfar, Kincardine, or Ross, and all these districts remain clean, or comparatively so, to-day. Thus it is not surprising to learn that in 1916 Lincolnshire, the Eastern and Home Counties, Kent and the South of England were generally free from Wart Disease. Had the distribution of seed potatoes, now outlined, remained fixed, it is probable that the disease would never have

become serious in the South and East; the War, however, had a very direct effect on the distribution, and the system of transport was considerably altered.

Effect of the War on Transport.—With the outbreak of war in 1914, and the German submarine blockade of the North Sea (so far as coastal shipping was concerned) all transference of seed potatoes to England was made by rail. The cost of sending seed by the indirect and long route from Ross, Forfarshire, Kincardine and Perth was great, and in many cases prohibitive. Fife and the Lothians seized the opportunity to develop new trade connections with the Eastern, Home, and Southern counties, and it is a significant fact that the disease has since spread in these areas at an alarming rate.

In 1916, owing to the abnormal conditions prevailing, Lancashire and Cheshire were the only districts where an average crop of potatoes was produced. The crops in other parts of Britain were so small that supplies were used up before Christmas. In the following spring (1917) the Food Production Campaign was started, and there was a general clamour from all parts of England and Wales for potatoes of any sort for planting.

The Irish crop, having been taken and reserved for the Army, was not available for the civil population. Lincolnshire and Scotch supplies were sadly deficient, so there was a general demand for Lancashire potatoes from many parts of England, and large supplies were sent out for planting by small gardeners in the recently established allotment gardens situated around populous areas such as London and Bristol.

By this combination of circumstances the spread of Wart Disease in the years following 1916 was facilitated, and the explanation of the rapid extension of the disease to the potato districts of the Eastern, Southern and South Western parts of England is to be found in the new distribution of seed potatoes brought about by war conditions.

Though conditions of the industry are rapidly improving and many pre-war customs have been re-established, it does not appear that the coastal shipping trade of seed potatoes has been resumed.

In 1919 inquiries in Lincolnshire showed that seed potatoes were being obtained from Forfar, Edinburgh, Perth, Glasgow and Stirling. In Scotland, Wart Disease is widespread in three of the areas mentioned, and if this practice continues experience indicates that Lincolnshire and the other Eastern counties may become heavily infected within a few years.

(To be concluded.)

THE ROOK:

ITS RELATION TO THE FARMER, FRUIT GROWER AND FORESTER.

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DURING the past few years farmers, fruit growers and others engaged in the cultivation of the land have shown an increased interest in the subject of the relation of our various species of wild birds to their calling.

Previously, the attitude of the majority of farmers and fruit growers was one of general condemnation. Upon the most untrustworthy and trivial evidence first one species and then another has been denounced. Many people, however, are no longer willing to accept the opinions of extremists, who either state that all birds are injurious and should therefore be destroyed, or that all birds are beneficial—"farmers' friends"—and should be preserved. All such extreme views obviously contain only a modicum of the truth, and there is a growing tendency, as the result of scientific investigation, to accept the opinion that a few species of wild birds in this country are injurious, but that the majority constitute a natural force of incalculable value to the agriculturist and the nation in general.

In view of this more thoughtful consideration of so important a subject it is extremely desirable that the farmer, fruit grower and forester should be able to obtain authoritative and trustworthy information respecting the various species of wild birds that protect his crops, and of those that destroy or are injurious to them. Further, if that information is to be of any use, it must be presented in such a form that it will be at once capable of interpretation and illustration, and, moreover, open to only one interpretation.

The importance of estimating the food content of birds by accurate methods needs to be emphasised, as if the method is faulty, it follows that incorrect results will be obtained.

Hitherto, in this country, most of the work on this subject has been based upon what is known as the numerical method, *i.e.*, the various items of food found in the stomach and crop have been counted, tabulated and grouped under three headings, as to whether the food eaten constitutes an injury or a benefit to agriculture, or is of a neutral character.

Apart from the fact that long lists of the names of insects, seeds and other foods eaten by birds are very difficult to compare one with another, the results are open to various interpretations. Supposing that we know that a certain bird has eaten 50 injurious and 25 beneficial insects, we learn nothing from these figures as to the ratio one lot of food holds to the other. Again, the apparent ratio of 50 to 25 is inaccurate, for the former may be composed of cockchafers and the latter of ichneumon flies. If, however, we can state the percentage of bulk that these two kinds of insects hold, then we have ascertained a definite piece of valuable information, capable of being used for purposes of comparison.

It must be borne in mind that a bird does not require so many injurious insects, so many beneficial insects and so many seeds per day, but a certain bulk of food, generally speaking three to four times the cubic capacity of its stomach; and if we have to form an estimate of the economic importance of this or that item constituting such bulk, it is essential that we should first know what proportion the particular food item constitutes to the birds' daily requirements. In order to do so we must express ourselves in terms of some method of measurement.

Another very important point to remember is that by the numerical method only part of the food is recorded, whereas it is necessary that every bit of the food taken into the crop and stomach be accounted for.

Let us suppose that the stomach of a blackbird is found to contain a mass of fruit pulp. How can we express this in numbers according to the numerical method? Who can say how many strawberries, blackcurrants, or plums are contained in the mass? To do so is impossible, but the quantity can be expressed in terms of its percentage, or the ratio it bears to the remaining food items, and if we have a sufficient number of stomachs, procured during each month of the year, then we can state very definitely that the amount of fruit found in the stomach of this bird averages, say, 14 per cent. In other words, we would know that this particular species could have eaten more fruit, but that it preferred other food, and also that of the, say, 7 lb. of solid food that each bird of this species requires in a year, $12\frac{1}{2}$ oz. consist of fruit. If the percentage which this figure represents is compared with that of injurious insects and other items, we can quickly form a rough

idea as to whether the sum total of the birds' activities are beneficial or injurious from the fruit grower's point of view.

In short, any system, to be of value, must be open to one interpretation only. It must take into account all the food present in the bird's stomach, crop, &c., and finally it must indicate the ratio which one item of food bears to another. Unless it does this the economic position of a bird cannot be accurately determined. Moreover, by no other method can we obtain the precise and detailed information necessary to enable comparisons to be made of the percentages of the different kinds of food eaten at various seasons of the year and in different districts.

In the light of what has been said, let us turn to a consideration of one of our commonest and most plentiful birds, the rook.

Generally and plentifully distributed throughout the British Isles, there are few of our wild birds better known than this species. Its sociable habits, and the fact that it usually nests in colonies in large trees near to or in the vicinity of human habitation, have all tended to make it familiar to us.

The nest, which is usually built about the middle of March, although both earlier and later dates have been recorded, consists of twigs sometimes solidified with earth or constructed upon the remains of a nest of the previous season, and is generally lined with grasses, roots, hay, straw, hair, wool and leaves. Three to 5 bluish-green eggs, blotched and streaked with olive-brown, are usually laid. Breeding is said to commence when the birds are nearly two years old. Both birds assist in sitting the eggs during the 17 or 18 days of incubation, although the major portion of the work seems to fall to the female. The fledging period has been recorded as occupying 29 to 30 days.

There is good reason to suppose that after the breeding season some of the birds emigrate to the Continent, while towards the end of September and through October and part of November, large numbers arrive on the east coast of Great Britain from Central Europe and Scandinavia, many of them departing in the following February, March, and April.

There would seem to be a general concensus of opinion that during the past ten or fifteen years the rook has largely increased in numbers in the British Isles.

Considerable controversy has taken place for many years past

as to whether the rook is beneficial or injurious to the farmer. So long ago as 1509 an Act of Parliament was passed placing a price upon the head of this bird, owing to the serious injury it caused to cereal crops, and the Act was revived in the reign of Queen Elizabeth.

To the farmer the question is not what a few individual specimens have eaten on a particular day or in a certain district, but what is the average percentage of the different food items eaten during each month of the year, based on the results obtained from a large series of birds, taken from different districts. Once in possession of these figures he can immediately form some estimate of how much damage he may expect from the visitations of these birds in a year, and also form an opinion as to whether this bird is beneficial or detrimental to his interests.

Conducting our investigation on the food of the rook on the lines suggested above, we are able to say, as a result of stomach examinations of a number of birds, that of the total bulk of food consumed in a year, 41 per cent. consists of animal matter and 59 per cent. of vegetable matter (see Fig. 1).

Further inquiry into the nature of the animal matter indicates that there are a number of items of varying quantities: thus we have 23.9 per cent. of injurious insects, 3.5 per cent. of beneficial insects, 4.6 per cent. of neutral insects, 4.4 per cent. of earthworms, 3.2 per cent. of slugs, snails and millipedes, and 1.4 per cent. of field mice, young birds, and the eggs of wild birds. The percentages of the different items are expressed diagrammatically in Fig. 2.

Turning next to an analysis of the injurious insects, we find that click beetles and their larvæ (wireworms) form 6.5 per cent. of the total, ground caterpillars 4 per cent., leather-jackets 5.5 per cent., other larvæ 3.5 per cent., snout beetles (weevils) 3.5 per cent., and miscellaneous injurious insects 0.9 per cent. It is not too much to say that these constitute some of the very worst and most troublesome pests with which the farmer has to contend, and most of them are exceedingly difficult to destroy.

The different items and percentages of the 59 per cent. of vegetable matter are stated in Fig. 3.

Summarising the figures, we find that 52 per cent. of the rook's food constitutes an injury to agriculture, 28.5 per cent. is beneficial, and 19.5 per cent. is of a neutral nature. These percentages are expressed diagrammatically in Fig. 4.

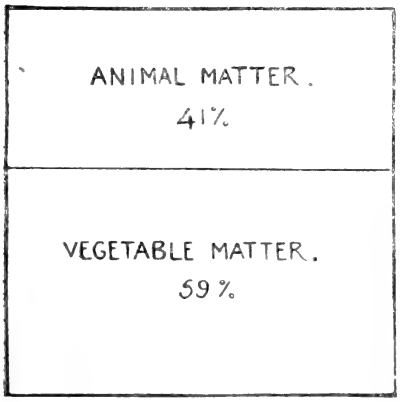

FIG. 1.

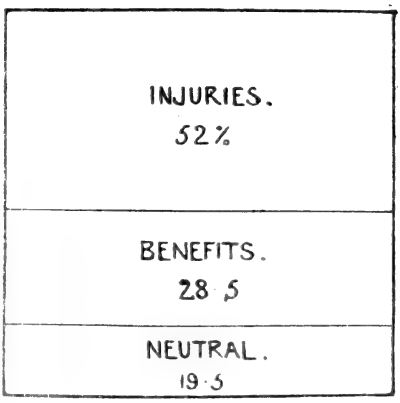

FIG. 4.

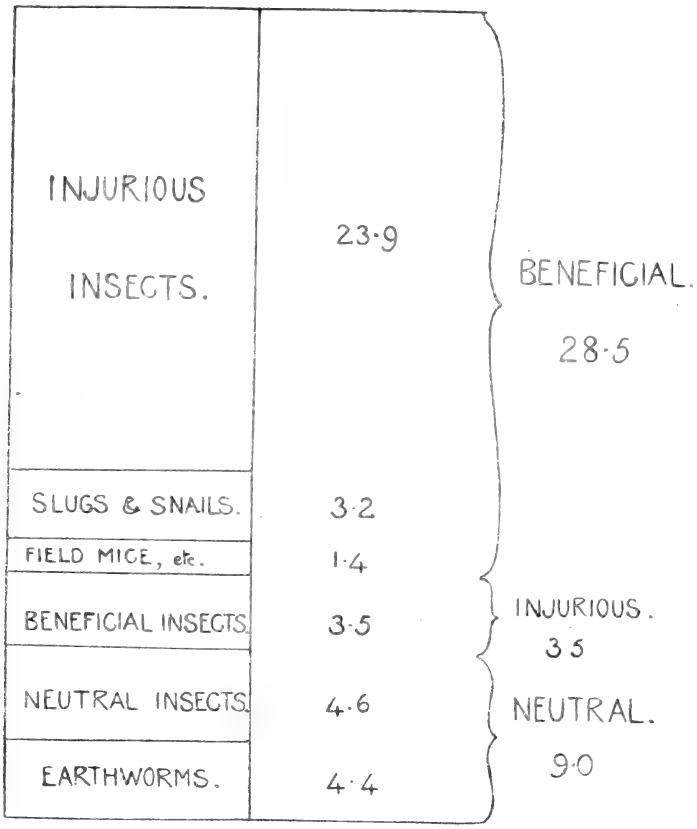

FIG. 2.

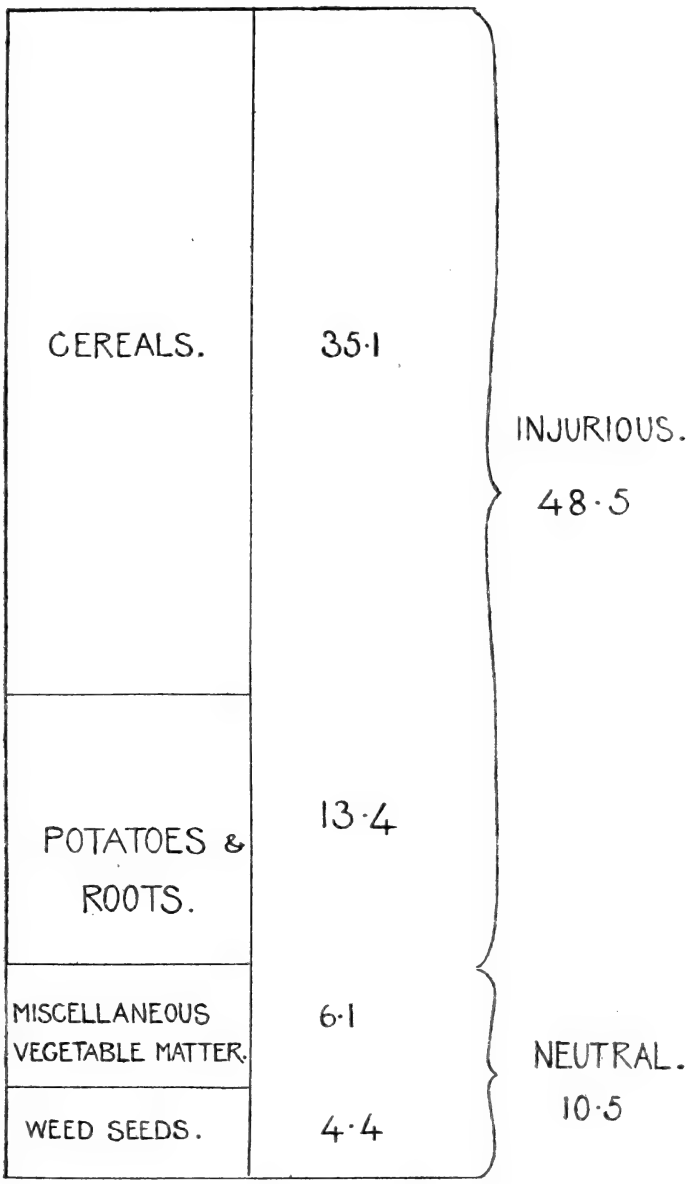
CEREALS.
35·1
POTATOES & ROOTS.
13·4
MISCELLANEOUS VEGETABLE MATTER.
6·1
WEED SEEDS.
4·4
INJURIOUS.
48·5
NEUTRAL.
10·5

FIG. 3.

Before pronouncing a verdict upon the rook, let us consider the significance of these figures from the point of view of the food supplies of the country.

From careful calculations we find that each rook consumes about 16 oz. of food per week, or 52 lb. in a year. Accepting this figure, as being probably reasonably accurate, it follows that 10,000 rooks will consume in a year about 232 tons of food, and in order to obtain this they destroy about—

80 tons of cereals,
32 tons of potatoes and roots,
7½ tons of beneficial insects,
65 tons of injurious insects, slugs, snails, &c.

It seems clear that the birds examined preferred cereals to any other kind of food. Further, we know that, generally speaking, there is no scarcity of the kinds of insects upon which the rooks feed, and that they could have eaten more, but that they chose cereals, possibly as being easier to obtain in the first instance and then as the result of an acquired taste. In all probability there were too many birds feeding upon the same kind of food in a given area, and that which was the most plentiful and most easily procured was taken.

Supposing the rooks had not destroyed this great bulk of injurious insects, would these latter not have done as much harm to cereals, roots, &c., as the rooks did? We think not, as a considerable percentage would have been eaten by starlings, jackdaws and black-headed gulls.

Moreover, there is fairly conclusive evidence that the rook has rapidly increased during the last ten or fifteen years, and records show that where the balance of Nature is disturbed in this manner, a bird almost invariably changes its diet. In other words, rooks are proving injurious because there are too many of them.

Even when reduced in numbers the rook would still continue to feed upon cereals to a certain extent, but the percentage would be considerably lower; in short, the benefits it conferred would exceed the injuries it inflicted, and therefore it would be to the ultimate benefit of the farmer to lose such a percentage of cereals in order to have destroyed the greater percentage of injurious insects, &c., for by no other agency could he so economically and so thoroughly attack these particular pests.

The conclusion we arrive at respecting the economic position of the rook, therefore, is that there are now too many of this species in the country and, as a result, too many birds feeding

upon the same kind of food in a given area; in consequence the rook has taken to feeding upon cultivated crops. History shows that this has happened again and again. Repressive measures are taken to reduce the number of birds, and for some years we hear no complaints about them injuring crops, but if permitted again to increase above a certain degree, they again become injurious. Therefore at the present time we strongly advocate repressive measures.

Repressive measures do not involve reckless and wanton destruction; any such unguided policy would, in all probability, lead to very serious and disastrous results. A systematic taking of the eggs or destruction of the nests in districts where the birds are too numerous would probably be sufficient.

If measures of this nature were put into force and carefully carried out, the rook would soon assume its normal place again, and it would prove to be one of the most useful birds to the farmer in helping to control the larvæ of such injurious insects as click beetles and crane flies.

In the absence of any census of wild birds it is impossible to state with any degree of accuracy the relative abundance of this species in the British Isles. Such a bird count is urgently needed for this and other species, but only where there is conclusive evidence of the superabundance of the bird should repressive measures be put into force, and then for only a stated period.

Twenty-one years ago the late Professor F. E. L. Beal wrote: "It may be said that the damage done . . . . has apparently arisen from the excessive number of individuals rather than from the habits of the species. Thoughtful students of nature have observed that every race or species has a certain high-water mark of abundance, beyond which it cannot rise without danger of encroaching upon and injuring other species. This is true of every species, whether at its normal abundance it be beneficial to man or otherwise. The exemplification of this principle is most noticeable in the case of insects, many species of which frequently exceed their ordinary bounds and spread destruction among crops. But the rule is equally applicable to birds; however useful they may be in a general way, it is possible under certain conditions that particular species may become too numerous." This is precisely what has occurred with regard to the rook in this country. It has risen above the "high-water mark of abundance," and in consequence has become injurious.

MANURES IN DECEMBER.

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The Purity of Sulphate of Ammonia.—Correspondence has recently appeared in some of the technical papers as to the value of neutral sulphate of ammonia in comparison with the older and somewhat acid material common some years ago, and one correspondent has raised the question as to whether there is any advantage to farmers in the neutral material. In favour of neutrality it is urged that the bags do not rot, as they are liable to do when acid is present; and further, that the neutral material is almost invariably in better condition than is the case with the old samples. Against this, however, it is stated that the trace of sulphate of iron present in the slightly acid sulphate of ammonia becomes converted, on neutralisation, into oxide, which is less soluble than the sulphate, and therefore less valuable as fertiliser.

From the agricultural point of view the neutral sulphate is undoubtedly an advantage. Acidity does not help the farmer in any way; it corrodes the implements, causes the bags to rot, and makes the material unpleasant to handle. We should not be prepared to say whether the condition is improved by neutralisation, or whether some other part of the purifying process may not tend to produce better condition of the samples; it is, however, important that the fertiliser should be in as good condition as possible and free from liability to cake.

So far as is known there is no advantage in the trace of iron present in the commercial sulphate, and it is quite immaterial from the farmers' point of view whether this is present as sulphate or as oxide. Ordinary agricultural soils contain from $2\frac{1}{2}$ or 3 per cent. up to 6 per cent. or more, or, stated in weight, from 25 to 60 tons or more per acre. It is highly improbable that the small additional amount added in sulphate of ammonia would exert any effect.

Periodically we are asked whether the unusual ingredients—iron, manganese, &c.—are of value as fertiliser. It is known that some of them may act beneficially in physiological experi-

ments carried out in sand or water cultures, but there is a very marked difference between these conditions and those obtaining in the soil. There is little, if any, evidence that small quantities are effective, and only occasionally are results obtained indicating that larger amounts are beneficial.

Use of Potash on Grass Land.—The question has been asked whether potash fertilisers are as beneficial as slag on grass land. Potash fertilisers do not produce so striking a change as slag; nevertheless, they are often of value on land laid in for hay, increasing both the quality and the quantity of the herbage. It is not so clear, however, that they are effective on grazing land, although even here improvement has resulted, especially on light or chalky soils. As a rule potash might be expected to give good results on any grass land where salt is known to be beneficial. In such cases the muriate would probably be as effective as the sulphate.

Sylvinite as a Potassic Fertiliser.—A correspondent who uses large amounts of potash states that he is experiencing some difficulty in securing supplies, and asks whether sylvinite is likely to be useful. This material is supplied in two grades, the declared analyses of which are :—

Description of the Salts.	Potassium Chloride.	Sodium Chloride.	Calcium Sulphate.	Insoluble.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Sylvinite 14% (French Kainite 12—14% K_2O) ...	19—25	60—66	2—5	10—12
do. 20—22% K_2O ...	32—35	50—55	2—5	9—10

There is every reason to believe that this material is of considerable value to mangolds, and on light and chalky soils for wheat and temporary leys. It might not prove so useful as sulphate of potash for potatoes, however, owing to the large amount of chlorides present.

Effect of Magnesium Salts as Fertiliser.—A correspondent has asked whether the magnesium salts present in kainit are likely to be harmful, or whether they might not exert some beneficial effect.

For ordinary farm crops, and particularly mangolds, sulphate of magnesia is not harmful, and indeed it may exert a beneficial effect. This is shown in the Rothamsted experiments on wheat. The crop yields were as follows :—

Effect of Alkaline Salts upon the Wheat Crop (Rothamsted).

Plot	Alkaline Salt added to Ammonium Salts and Superphosphate in Manure	1852-1861	1862-1871	1872-1881	1882-1891	1892-1901
	Grain, bushels.					
11	None	28·4	27·9	21·7	22·7	19·5
12	Sulphate of Soda	33·4	34·3	25·1	30·1	26·7
13	Sulphate of Potash	32·9	34·8	26·8	32·5	29·6
14	Sulphate of Magnesia	33·5	34·4	26·4	31·1	25·0
7	Sulphates of Soda, Potash and Magnesia	34·7	35·9	26·9	35·0	31·8
	Straw, cwt.					
11	None	28·2	24·5	21·3	20·8	18·8
12	Sulphate of Soda	34·2	30·5	25·0	27·3	24·0
13	Sulphate of Potash	34·1	33·4	27·6	31·9	28·6
14	Sulphate of Magnesia	35·0	30·7	26·3	28·6	23·4
7	Sulphates of Soda, Potash and Magnesia	36·4	34·3	28·7	34·1	31·1

It will be observed that Plot 14, supplied with sulphate of magnesia, gave for many years results as good as Plot 13, supplied with sulphate of potash, although subsequently it fell behind considerably. Analysis shows that magnesia enabled the plant to obtain more potash from the soil than it would otherwise have done, and there is further evidence that magnesia enables the plant to make fuller use of the potash it is able to obtain. Similar remarks apply to sulphate of soda, which, also, is not harmful, but indirectly beneficial, increasing the availability of the soil potash.

Care of Manure Heaps.—Now that the season for clearing the yards is at hand we must again emphasise the need for avoiding waste of farmyard manure. It has been shown, both on the heavy land at Rothamsted and on the light land on Lord Elvedon's farm at Woking, that a sheltered manure heap is better than one exposed to the air, even a little shelter being better than nothing. The farmer gains in two ways; the resulting manure is better ton for ton, and there is more of it. The gains due to sheltering were :—

	Excess of yield from sheltered heap over that from exposed heap.
At Rothamsted :	
Potatoes	7 cwt. per acre.
Wheat : grain	5 bush. per acre.
do. straw	4 cwt. per acre.
At Woking :	
Wheat : grain	2 bush. per acre.
do. straw	2 cwt. per acre.

Effect of Sheltering Manure: a Practical Trial.—A correspondent from Ireland sends particulars of a trial conducted to ascertain the effect of providing shelter for farmyard manure

after it has been made into a heap for application in the field. Two heaps were made up as nearly equal as possible; one was sheltered under a shed, and the other left in the open in the ordinary way. When the time came for application to the land approximately equal weights from the two heaps were applied to equal areas of land, viz., about 18 tons per acre. The crop grown was potatoes (Arran Chief), and the results were :—

	tons.	cwt.
Covered manure...	9	14½
Not covered	7	14¾

It would appear, therefore, that sheltering the heap caused a distinct improvement in value and led to an increase of nearly two tons in the crop. It is probable that the benefits were even greater than appear, as the sheltered heap would be likely to weigh more than the unsheltered in the end, owing to less loss through the washing of rain.

Application of Superphosphate and Potash on Stubbles.—A farmer has inquired whether there is any objection to sowing superphosphate and potash on the stubble previous to ploughing. He points out that if these fertilisers are applied the manure distributor runs much more easily than on ploughed land, and that the whole process is cleaner and more convenient. So long as the ploughing is not too deep there is no objection to sowing these fertilisers on the stubble, as there is no great risk of their being washed out; if, however, they are ploughed in below the depth of the seedlings they will be out of the way of the young plant roots just at the time when they are most wanted. On the whole the ordinary practice of drilling manures at or about the time of sowing is more effective.

Organic Manures.—Results obtained in careful tests of organic manures at Rothamsted show the following order of merit when Peruvian guano, rape cake and shoddy are compared on the basis of equal amounts of nitrogen per acre. The results are from yields obtained in the year of application.

Peruvian guano	100
Rape cake	91
Shoddy	88

Shoddy showed a residual effect which would improve its position.

Leather as Manure.—Considerable interest has been evinced from time to time in the question as to whether leather waste can be converted into manure. There is a very real shortage

of organic fertilisers, and anything that would help to increase the supplies would be welcomed. Attention may be directed to the experiment carried out at the Woburn Station, where ground leather powder was applied on swedes at the rate of 1 ton per acre to one plot, while another received 1 ton per acre of leather treated with sulphuric acid so as to make the nitrogen soluble; a third plot received a dressing of sulphate of ammonia supplying as much nitrogen as was in the leather. Sulphate of ammonia produced its full effect, but the leather had no action at all.

Comparison of Bone Meal with Slag.—An interesting experiment has been in progress for some years at Cockle Park, to test the comparative values of bone meal and basic slag on hay land. The results are:—

Plot.	Treatment per Acre, Feb., 1908, Redressed Dec., 1910, Dec., 1916, and Dec., 1919.	Average Annual Cost of Treatment.	Hay Per Acre.			Value of Increase at 50/- per ton.	Average Annual Gain.
			1919.	Average of 12 Years.	Average Increase over Plot 1.		
		s. d.	*cwt.*	*cwt.*	*cwt.*	*s. d.*	*s. d.*
1	(To the west) No treatment	—	1	7½	—	—	—
2	10 cwt. **High Grade Basic Slag**, 39·32% Phosphates (200 lb. Phosphoric Acid) ...	8 0	13½	22¾	15¼	38 1	31 5
3	14 cwt. **Medium Grade Basic Slag**, 27·39% Phosphates (200 lb. Phosphoric Acid)	9 4	12¼	21½	14	35 0	25 8
4	19¾ cwt. **Low Grade Basic Slag**, 19·82% Phosphates (200 lb. Phosphoric Acid) ...	10 8	12¾	19½	12	30 0	19 4
5	8¾ cwt. **Bone Meal**, 45·09% Phosphates (200 lb. Phosphoric Acid)	18 8	13	20¼	12¾	31 11	13 3

Bone meal is shown to have given a marked increase in yield over the unmanured plot, but it is no better than medium grade slag and not so good as high grade slag. The financial return from bone meal has been less than from any of the slags and less than half from the best slag plot.

Value of the Solubility of Basic Slag.—Mr. Scott Robertson has recently summarised the results obtained by the use of the various slags and mineral phosphates in Essex. His results throw considerable light on the important question as to whether the farmer is justified in paying extra prices for high soluble slags. The crop returns show that high grade slag is, as a matter of fact, rather better than low grade, especially in

improving the quality of the herbage. The difference is not so great as would be expected from the difference in solubility, and it seems clear that present-day analytical methods do not deal satisfactorily with present-day slags; this subject is under further investigation. Meanwhile, Mr. Robertson's experiments show that ground rock phosphate is distinctly useful on grass land, being little, if any, inferior to some of the basic slags. Farmers who have difficulty in obtaining a supply of slag, therefore, may make trial of some of these mineral phosphates. Mr. Robertson's results are as follows:—

Manures, 200 lb P_2O_5 per Acre.	Citric Solubility of the Phosphate.	Hay, Cwt. per Acre.					
		Boulder Clays.		London Clay.			Chalk.
		Tysea Hill. Average of 4 Years	Martins' Hearne. Average of 3 Years.	Latchingdon. Average of 4 Years.	Horndon. 1 Year.	Lambourne Jnd. 1 Year (1919).	Saffron Walden. Average of 4 Years.
High Grade Basic Slag	92	30·9	—	31·7	—	—	41·2
Gafsa Rock Phosphate	38	30·5	29·1	29·7	23·0*	25·0†	38·7
No Manure	—	20·3	16·0	21·7	15·5	13·2	31·1
Open Hearth Fluorspar Basic Slag (1)	45	32·8	—	30·8	—	—	40·0
do. do. (2)	20	—	22·7	—	18·8	26·6	—
do. do. (3)	32	—	—	—	—	16·0	—
Low Grade High Citric Sol. Basic Slag (1)	93	32·8	—	31·6	—	—	35·2
do. do. (2)	82	32·3	—	33·9	—	—	40·2
do. do. (3)	91	—	30·2	—	22·5	24·5	—
do. do. (4)	80	—	—	—	—	23·7	—
Average Rainfall, 1st May until Harvest (inches)	—	4·66	6·91	4·88	2·28	3·26	2·74
do. 1st April until Harvest (inches) ...	—	7·02	9·35	7·11	4·64	6·46	5·26

* Egyptian phosphate. † Cambridge coprolites.

The analyses of the crops gave the following results:—

Type of Vegetation.	Farnham (Boulder Clay Soil).			Horndon (London Clay Soil).		
	Plot 1. Open Hearth Basic Slag (Solubility 20 %).	Plot 2. High Citric Soluble Basic Slag (Solubility 91 %).	Plot 3. No Manure.	Plot 18. Open Hearth Basic Slag (Solubility 20 %).	Plot 17. High Citric Soluble Basic Slag (Solubility 91 %).	Plot 16. No Manure.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Clovers ...	27·1	50·2	16·2	43·8	46·2	9·4
Grasses ...	45·0	33·3	18·4	31·8	47·2	19·1
Weeds ...	16·0	13·5	25·0	13·3	1·4	26·0
Bare Space	11·9	3·0	40·4	11·1	5·2	45·5

Liming and Chalking.—From the large amount of correspondence received at Rothampsted on the subject of liming and chalking, it is evident that farmers take great interest in this subject. There is no need to emphasise the importance of lime; every farmer knows it. There is, however, considerable difficulty in practice in getting the work done, and it is worth considering whether co-operative societies could not usefully help.

Mr. Harald Faber gives an account of the "Marling" Societies of Denmark* which distribute marl or chalk from the quarries for use on the land. The societies arrange for a district to be treated and then lay a light movable railway as far as they can so as to facilitate transport. The undertaking was started as a single private venture with a small Government Grant. The profits are limited by statute and are put into the business as new capital. During the years 1904-16 these societies transported over 3,000,000 cubic yards of marl on their light railways. If some such organisation could be established in this country it might be expected to give very good results.

* "Co-operation in Danish Agriculture," by Harald Faber. London: Longmans, Green & Co., 1918.

FEEDING STUFFS IN DECEMBER.

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As notified in the November issue of this JOURNAL, *the preparation of these notes will in future be undertaken by the Intelligence Department of the Ministry. Mr. Halnan has for the past eight years worked in close association with Professor Wood at the Animal Nutrition Institute, Cambridge, on questions affecting Animal Nutrition, and in the future preparation of these notes will maintain close contact with Professor Wood, and the results obtained at Cambridge. Criticisms of the notes published, and suggestions for their improvement, will be welcomed.*

PRICES of feeding stuffs have eased somewhat during the past month, maize, beans, peas, imported feeding barley, ground nut and common cotton cake all showing a decline in price. A few feeding stuffs have firmed in price, and reports indicate that the decline in the price of commodities foreshadowed in last month's notes is not likely to be followed at all closely by a corresponding decline in the prices of feeding stuffs.

Wet grains, from the price standpoint, are still the cheapest feeding stuff on the market. The advantage to be gained by using wet grains is not as marked as the price would indicate, in view of the bulky nature and waste in feeding. In this connection, several correspondents have inquired whether it is possible to store wet grains. This practice is common in Kent, and can be carried out with advantage wherever the farm is provided with pits or vats for storage. The grains are trodden well down when filling the pit, and in some cases a slight sprinkling of salt is scattered over the surface layer at foot intervals. The pits must be protected from rain. Grains thus stored will keep wholesome for months. It is desirable to have two pits, if possible, so that when feeding from one pit the other pit may be ready for filling with fresh grains. Feeding commences from the top of the pit and proceeds until the pit is completely empty. It is then ready for re-filling.

Among the oil cakes, palm kernel cake and coconut cakes form the cheapest feeding stuffs on the market. These cakes are particularly suitable for feeding to dairy cows.

NAME.	Price per Qr. s.	lb.	Price per Ton. £ s.	Manurial Value per Ton. £ s.	Food Value per Ton. £ s.	Starch Equiv. per 100 lb.	Price per Unit, Starch Equiv. s.	Price per lb. Starch Equiv. d.
Barley, English Feeding	85/-	400	23 16	1 6	22 10	71	6/4	3·39
„ Foreign - -	72/-	400	20 3	1 6	18 17	71	5/4	2·86
Oats, English - -	59/-	336	19 13	1 9	18 4	59·5	6/1	3·26
„ Foreign - -	56/-	320	19 12	1 9	18 3	59·5	6/1	3·26
Maize - - - -	73/-	480	17 0	1 5	15 15	81	3/11	2·09
Beans, English spring -	95/-	532	20 0	3 1	16 19	66	5/2	2·77
„ „ winter -	90/-	532	18 19	3 1	15 18	66	4/10	2·59
„ Chinese - -	20/-	112	20 0	3 1	16 19	66	5/2	2·77
Peas, English blue -	102/-	504	22 13	2 13	20 0	69	5/10	3·12
„ „ dun -	100/-	504	22 4	2 13	19 11	69	5/8	3·03
„ „ maple -	107/-	504	23 15	2 13	21 2	69	6/-	3·21
„ Japanese - -	150/-	504	33 7	2 13	30 14	69	8/11	4·77
Buckwheat - - -	—	—	—	—	—	—	—	—
Rye, English - -	84/-	480	19 10	1 8	18 2	72	5/1	2·73
Millers' offals—Bran -	—	—	14 10	2 10	12 0	45	5/4	2·86
„ „ Coarse middlings	—	—	15 10	2 10	13 0	64	4/1	2·19
Barley meal - - -	—	—	25 0	1 6	23 14	71	6/8	3·53
Maize „ - - -	—	—	19 0	1 5	17 15	81	4/4	2·37
Bean „ - - -	—	—	24 0	3 1	20 19	66	6/4	3·39
Fish „ - - -	—	—	25 0	7 12	17 8	53	6/7	3·53
Cakes, Linseed - -	—	—	23 0	3 12	19 8	74	5/3	2·81
„ Soya - - -	—	—	24 0	5 4	18 16	69	5/3	2·81
„ Cotton seed -	—	—	13 10	3 5	10 5	42	4/10	2·59
„ Cotton seed decorticated	—	—	20 10	5 6	15 4	71	4/3	2·28
„ „ decorticated meal	—	—	20 10	5 6	15 4	71	4/3	2·28
Coconut cake - -	—	—	16 0	3 0	13 0	79	3/3	1·74
Groundnut cake - -	—	—	13 15	3 9	10 6	57	3/7	1·92
„ decorticated	—	—	18 0	5 5	12 15	73	3/6	1·87
Palm kernel cake - -	—	—	15 0	2 1	10 19	75	2/11	1·56
„ „ meal - -	—	—	13 5	2 1	11 4	75	3/-	1·61
Brewers' grains, dry -	—	—	11 12	2 7	9 5	49	3/9	2·01
„ „ wet -	—	—	1 4	0 12	0 12	15	0/10	0·46
Distillers' „ dry -	—	—	12 12	2 16	9 16	57	3/5	1·83
„ „ wet -	—	—	1 7	0 13	0 14	16	0/10	0·46
Malt culms - - -	—	—	10 7	3 6	7 1	43	3/3	1·74
Potatoes - - -	—	—	4 17	0 8	3 9	18	3/10	2·00
Swedes - - -	—	—	1 12	0 5	1 7	7	3/10	2·00
Mangold - - -	—	—	1 9	0 6	1 3	6	3/10	2·00

NOTE.—The prices quoted above represent the average prices at which actual wholesale transactions have taken place in the larger markets, usually London, and refer to the price ex mill or stores. They are, as a rule, considerably lower than the prices at local country markets, the difference being due to carriage and dealers' commission. Buyers can, however, easily compare the relative prices of the feeding stuffs on offer at their local market by the method of calculation used in these notes. Thus, suppose palm kernel cake is offered locally at £15 per ton. Its manurial value is £2 1s. per ton. The food value per ton is therefore £12 19s. per ton. Dividing this figure by 75, the starch equivalent of palm kernel cake as given in the table, the cost per unit of starch equivalent is 3s. 6d. Dividing this again by 22·4, the number of pounds of starch equivalent in 1 unit, the cost per lb of starch equivalent is 1·88d. A similar calculation will show the relative cost per lb. of starch equivalent of other feeding stuffs on the same local market. From the results of such calculations a buyer can determine which feeding stuff gives him the best value at the prices quoted on his own market.

Experiments carried out with weanling pigs of the Tamworth breed have demonstrated that beet molasses is an unsuitable feed for weanling pigs. Thirty pigs aged 9 and 12 weeks were fed on a ration of two parts ground barley and three parts wheat shorts. The pigs were divided into three lots of ten each; two of these lots received in addition to the above ration a certain quantity of beet molasses. Of the twenty pigs receiving molasses no less than fourteen died before the end of the experiment, whereas not a single death occurred in the lot receiving ground barley and wheat shorts only. The harmful effect of the molasses was also evident in the surviving six pigs. It is, therefore, very evident that in compounding rations for weanling pigs care should be taken to avoid the inclusion in the ration of any feeding stuffs containing molasses as one of its items.

QUESTIONS IN PARLIAMENT.

Arable Cultivation.—In reply to Mr. Royce, the Parliamentary Secretary to the Ministry stated that information as to the acreage of arable land in the whole of the United Kingdom in 1920 was not available, but that the acreage of land under arable cultivation in England and Wales on 4th June, 1920, was 12,020,000 acres, 289,000 acres less than a year earlier, and 379,000 acres less than on the 4th June, 1918. He added that the area of land under arable cultivation at 4th June, 1920, was 1,022,000 acres greater than at 4th June, 1914, when the total was 10,998,000 acres. (1st November, 1920.)

Wheat Production.—In reply to Mr. Cape, the Parliamentary Secretary to the Ministry stated that the returns of the production of wheat this year were not available for the whole of the United Kingdom, but that the estimated production in England and Wales was 6,677,000 quarters. The average annual quantity used for seed in the past 10 years was estimated at about 750,000 quarters. (1st November, 1920.)

Foot-and-Mouth Disease.—In reply to Major D. Davies, the Parliamentary Secretary to the Ministry stated that the prolonged inquiry had failed to establish any relation between imported packing material and the numerous invasions of Foot-and-Mouth Disease which had occurred. The importation of hay and straw from all European countries, except Norway, was already prohibited, with certain exceptions, which included hay and straw actually used for packing merchandise. The Departmental Committee on Foot-and-Mouth Disease, in its report dated May, 1912, stated that it recognised that packing straw constituted a source of danger, but that, in view of the serious dislocation of general trade which such action would entail, the Committee was not prepared to advise its prohibition until there was further evidence against it. In the absence of any evidence connecting the outbreak of Foot-and-Mouth Disease with packing materials, the Ministry was not prepared to consider the prohibition of the importation of hay and straw in every form. (27th October, 1920.)

Land Settlement of Ex-Service Men.—In reply to a question by Mr. Wintringham, the Parliamentary Secretary to the Ministry stated that the number of men actually settled and in possession of their holdings under the Land Settlement Acts was 8,314, of whom 7,610 had been settled by County Councils, and 704 on the Ministry's farm settlements. In addition, sufficient land had already been acquired to settle a further 8,866 men as soon as it could be equipped and made available. The total number of applications received was 43,175, of whom 24,474 had been approved. The total number of acres acquired was 257,859. He stated that he could not give complete figures of expenditure on land purchased, but as regards 219,604 acres, of which he had returns, the cost was £9,315,000, or £42 per acre. He had no information of the advances made by County Councils, but 25 advances had been made by the Ministry, totalling £3,640. (21st October, 1920.)

In reply to Capt. Coote, the Parliamentary Secretary to the Ministry stated that it was not correct to say that the moneys voted by Parliament for the purpose of carrying out the provisions of the Land Settlement Act were about to be exhausted, or that it had cost £20,000,000 to put about 9,000 men on the land. The land already acquired, namely, 259,489 acres, would cost, when fully equipped, about £15,000,000 for purchase, buildings, roads, water supply,

&c., and some 17,200 men would be settled on this area. The present position of land settlement in England and Wales had recently been thoroughly investigated by a Cabinet Committee, and a letter was about to be addressed by the Ministry to each County Council, embodying the decisions which had been reached, and, *inter alia*, stating that additional funds would be provided by the Treasury for land settlement purposes. (1st November, 1920.)

In reply to Capt. Terrell, the Parliamentary Secretary to the Ministry stated that the total number of ex-service men who had applied to the Ministry and to County Councils and Councils of County Boroughs was 44,229. Up to the present 25,038 had been approved and about 7,700 were awaiting interview as to their qualifications. The area acquired since the 1st January, 1919, was 260,553 acres, and proposals for the acquisition of a further 30,000 were at present under consideration by the Ministry. The number of men actually settled was 10,487, of whom 9,042 were ex-service men, and it was estimated that the land acquired and not yet let would provide holdings for a further 8,000 men, as soon as the additional cottages and buildings could be erected. (15th November, 1920.)

Farm Colonies.—In reply to Mr. G. Roberts, the Parliamentary Secretary to the Ministry stated that the number of farm settlements in England and Wales was 14, and the settlers numbered 706. Of these 531 were ex-service men, and 14 were ex-service women. Seven settlements contained a central farm. The purpose of the latter was not, however, to train men, as all settlers were required, before admission, to have had sufficient experience or training to manage a small holding, or to undertake other farm work. (25th October, 1920.)

Allotments.—In reply to Captain Terrell, the Parliamentary Secretary to the Ministry stated that he was not in a position to say how many allotments had been created since the beginning of the year, and how many had reverted to other uses. A return would be obtained after the end of the year from each allotment authority in England and Wales, showing the acreage acquired for allotments and the number of allotment holders provided for under the Small Holdings and Allotments Act, 1908, and the Land Settlement (Facilities) Act, 1919, and it was proposed to embody in the Ministry's Annual Report to Parliament under Section 59 of the Small Holdings and Allotments Act, 1908, a summary of the information thus obtained. (1st November, 1920.)

Exported Horses: Standard of Fitness.—In reply to Major Steele, the Parliamentary Secretary to the Ministry stated that his attention had been called to articles appearing in the Press on the subject of the sale of worn-out horses to the Continent, and that the statements appeared generally to be made under a misapprehension as to the facts. The Diseases of Animals Act, 1910, as amended by the Exportation of Horses Act, 1914, prohibits the shipment of worn-out horses without a written guarantee from a veterinary inspector of the Ministry, to the effect that the horses are capable of being conveyed and worked without suffering.* The Ministry insists on a strict interpretation of the standard of fitness. The average price of the exported horses, was, he understood, £28, and the cost of shipment varied between £4 and £6. He had no reason to believe that any horses were being shipped which failed to reach the requisite standard. (1st November, 1920.)

* See the issue of this *Journal* for last month, p. 709.

AGRICULTURAL RETURNS, 1920:

PRODUCE OF CROPS IN ENGLAND AND WALES.

The following Memorandum on the Agricultural Returns of England and Wales for 1920 was issued by the Ministry on the 1st November :—

The corn crops were adversely affected by the cold, sunless weather of the past summer, and are not threshing out so well as farmers expected. This applies more particularly to wheat and oats in the west of England and in Wales. Harvest was late and is not yet over, and in some of the later districts much less threshing than usual has been done. Crops ripened slowly, and in the north a larger acreage than usual has been cut green. The harvest has been very protracted, but on the whole the corn in many parts has been secured under moderately favourable conditions. In the later districts in the north some grain has sprouted, owing to the absence of drying winds and the prevalence of heavy mists and dews.

The total production of *Wheat* in England and Wales is estimated at 6,677,000 quarters, which is 1,300,000 quarters less than last year. The yield per acre, 28·5 bushels, is slightly less than last year, and the smallest since 1904. On the average the yield per acre over most of the eastern counties is about 1½ bushels above the ten-year mean, but in Lincolnshire and the East Riding yields are not so large as usual. Crops were very bad in the west-midland and south-western counties, where the yields average about 7 bushels per acre less than the ten-year mean. *Barley* is the most satisfactory of the three chief corn crops, the yield, 31 bushels per acre, being very slightly below average. As with wheat, results were most satisfactory in the eastern counties and poorest in the west midlands and south-west, though in Cornwall barley gave over-average results. The total production is 6,336,000 quarters, an increase of 860,000 quarters as compared with last year, and 670,000 quarters above the average of the previous ten years. *Oats* yielded 38 bushels per acre, or nearly 2½ bushels more than in 1919. Over-average yields were the rule in the eastern half of the country, while in the western half the results were in the opposite direction, crops being worst in Wales and the south-west. The total production has amounted to 10,760,000 quarters, which is about 160,000 quarters above the ten-years' average, but 660,000 quarters less than last year. *Mixed corn* averaged 33·1 bushels per acre, and produced 605,000 quarters, or 17,000 quarters less than in 1919. *Beans* were a satisfactory crop, the yield per acre, 31·1 bushels, being about 3¾ bushels above the decennial mean and 6 bushels more than last year. The total crop is 956,000 quarters, an excess of 100,000 quarters over last year. *Peas* also gave an over-average yield, 27·4 bushels, or 2½ bushels more than usual. The total production, 444,000 quarters, is practically the same as last year.

The yield per acre of *Seeds' Hay* was 30·9 cwt., or 2½ cwt. above average and more than 7 cwt. heavier than in 1919. The acreage was also greater than last year and the total production, which amounted to 2,588,000 tons, exceeded last year's total by nearly 50 per cent. Crops of *Meadow Hay* were also good, the yield averaging 25·7 cwt. per acre, or 4 cwt. more than the decennial mean, and the best yield since 1907. The total production, 5,650,000 tons, is 2,230,000 tons greater than last year. Taking both kinds of hay

together the total crop is estimated at 8,238,000 tons, and slightly over 3,000,000 tons greater than last year. Farmers, therefore, have large stocks of hay for the coming winter, but it must be remembered that, owing to the very unfavourable weather at hay time, a large proportion was carted in a more or less damaged condition, and the feeding value is therefore not up to the usual standard.

The estimate of the hop crop was issued on the 26th October, and the estimates of the potato and root crops will be issued subsequently.

AGRICULTURAL RETURNS OF ENGLAND AND WALES, 1920.

PRELIMINARY STATEMENT showing the Estimated Total Produce and Yield per Acre of the CORN, PULSE, and HAY CROPS in England and Wales in the Year 1920, with Comparisons for 1919, and the Average Yield per Acre of the Ten Years 1910-1919.

—	Crops.	Estimated Total Produce.		Acreage.		Average Estimated Yield per Acre.		Average of the Ten Years 1910—1919.
		1920.	1919.	1920.	1919.	1920.	1919.	
		Qr.	*Qr.*	*Acres.*	*Acres.*	*Bush.*	*Bush.*	*Bush.*
ENGLAND AND WALES.	Wheat	6 677,000	7,976,000	1 874.634	2,221,195	28·5	28·7	30·6
	Barley	6 336 000	5,474,000	1 637,166	1,509,716	31·0	29·0	31·2
	Oats .. .	10,760 000	11,417,000	2·264·635	2,563,733	38·0	35·6	38·8
	Mixed Corn ..	605 000	622,000	146 346	142,235	33·1	35·0	—
	Beans	956 000	855,000	246 335	273,941	31·1	25·0	27·3
	Peas	414 000	441,000	129.325	132,249	27·4	26·7	24·9
		Tons.	*Tons.*			*Cwt.*	*Cwt.*	*Cwt.*
	Seeds' Hay* ..	2 583 000	1,769,000	1.674.512	1,501,253	30·9	23·6	28·4
	Meadow Hay† ..	5.650 000	3,417,000	4.395,258	4,170,509	25·7	16·4	21·7
		Qr.	*Qr.*			*Bush.*	*Bush.*	*Bush.*
ENGLAND.	Wheat	6.523.000	7,728,000	1 824 086	2,150,281	28·6	28·8	30·7
	Barley	5 983 000	5,074,000	1 537 941	1,405,643	31·1	28·9	31·2
	Oats	9,846 000	10,052.000	2 015.477	2,251,558	39·1	35·7	39·2
	Mixed Corn ..	511.000	511,000	120 593	115,455	33·9	35·4	—
	Beans	949 000	847,000	244.477	271.481	31·1	25·0	27·3
	Peas	442 000	440,000	128.753	131,718	27·5	26·7	24·9
		Tons.	*Tons.*			*Cwt.*	*Cwt.*	*Cwt.*
	Seeds' Hay ..	2 329 000	1,600,000	1.483.219	1.342,131	31·3	23·8	28·8
	Meadow Hay ..	5 071 000	3,028,000	3.902.830	3,694,597	26·0	16·4	21·9
		Qr.	*Qr.*			*Bush.*	*Bush*	*Bush.*
WALES.	Wheat	154 000	248.000	50.548	70.914	24·5	28·0	27·8
	Barley	353 000	400,000	99 225	104.073	28·5	30·7	30·5
	Oats	914.000	1,385,000	249 158	312,175	29·3	35·0	35·1
	Mixed Corn ..	94 000	111,000	25.753	26,780	29·2	33·2	—
	Beans	6 900	7,800	1.858	2,460	29·5	25·5	27·3
	Peas	1.600	1,400	572	531	22·1	21·7	22·4
		Tons.	*Tons*			*Cwt.*	*Cwt.*	*Cwt.*
	Seeds' Hay ..	259 000	169.000	188 293	159,122	27·6	21·3	25·3
	Meadow Hay ..	579.000	389,000	492.428	475,912	23·5	16·4	19·6

* Hay from Clover, Sainfoin, and Grasses under rotation. † Hay from Permanent Grass.

Egg Prices.—The Food Controller has issued an Order (No. 1972), dated 25th October, 1920, amending the Eggs (Prices) Order, 1919 (No. 1686 of 1919*). The General Licence dated 20th March, 1920 (No. 405 of 1920), issued under the principal Order, is revoked, and the following schedule of maximum prices substituted :—

Description of Eggs.	*Other than Retail. At the Rate of per Dozen.* s. d.	*Retail. At the Rate of per Dozen.* s. d.
Fresh eggs	5 4	6 0
Imported fresh eggs ...	5 4	6 0
Preserved eggs	4 5	5 0
Chinese eggs	3 7	4 0
Small eggs...	2 8	3 0

The expression "eggs" includes the eggs of any bird, except plovers' eggs and gulls' eggs.

"Fresh eggs" means eggs produced in the United Kingdom each weighing 1½ oz. or more, and not having been preserved either by pickling or by being held in cold store or otherwise.

"Imported fresh eggs" means eggs (other than eggs imported from China) imported into the United Kingdom each weighing 1½ oz. or more, and not having been preserved either by pickling or by being held in cold store or otherwise.

"Preserved eggs" means eggs (other than eggs imported from China) each weighing 1½ oz. or more, which have been preserved either by pickling or by being held in cold store or otherwise.

"Chinese eggs" means eggs imported from China, each weighing 1½ oz. or more.

"Small eggs" means all eggs weighing less than 1½ oz.

The expression "sale by retail" means any sale other than a sale to a person buying for the purpose of resale.

For detailed particulars of the terms and conditions applicable to transactions, the actual Orders referred to above should be consulted. Copies of these Orders may be obtained from His Majesty's Stationery Office, Imperial House Kingsway, London, W.C.2., Price 1d., excluding postage.

Ministry's Exhibit of Varieties of Potatoes Immune from Wart Disease.—The exhibit of varieties of potatoes immune from Wart Disease which was staged at the Ormskirk (Lancs.) Society's Potato Show on the 27th and 28th October, will be shown at the following Agricultural Shows, in addition to those at which it has already appeared :—

Dalton-in-Furness Show	December 4th
Sheffield Show	,, 11th
York Fat Stock Show	,, 14th to 16th
Gainsborough Show	,, 18th

Leaflets issued by the Ministry.—Since the date of the list given on page 786 of last month's issue of this *Journal*, the following leaflets have been issued :—

No. 356.—Mole Draining.

,, 358.—Fruit and Vegetable Drying (previously issued as Food Production Leaflet No. 9).

* See this *Journal*, January, 1920, p. 1033.

In addition, the information contained in the following leaflets has been revised and brought up to date :—

No. 72.—The Purchase of Artificial Manures.

„ 175.—The Use of Waste Organic Substances as Manures.

„ 285.—Bacon Curing on the Farm.

„ 298.—Pig Keeping for Cottagers and Small Holders.

Map showing Areas declared Infected with Wart Disease in Scotland.—The Ministry has issued a map showing those districts of Scotland which have been declared Infected Areas owing to the presence of Wart Disease in gardens and allotments. This map should assist potato dealers and others who desire to obtain "seed" potatoes from those parts of Scotland where Wart Disease does not exist.

Copies of the map (price 3d.) may be obtained post free from the Ministry's Offices at 3, St. James's Square, London, S.W.1.

Extension of the Rothamsted Laboratories.—It is proposed to extend the Rothamsted Laboratories at an early date so as to make much needed provision for the investigation of diseases and pests of farm crops which now cause much loss to the agriculturist. As a first step in the extension the Rothamsted Trustees propose to acquire a house and garden which occupy a large part of the island site on which the laboratories stand, and which the owner is prepared to sell.

Half of the money required was contributed by the Development Commission out of the Development Fund ; most of the remainder has been given by important firms and organisations connected with the supply of farmers' materials, and a few of the members of the Society for Extending the Rothamsted Experiments. Almost the full amount has now been collected, the sum of £237 only being still needed.

Plans for the new laboratories have been drawn up, and a commencement will be made as soon as building conditions become more stable.

The Rothamsted Trustees hope that those interested in agricultural investigation and research will aid the fund by sending subscriptions (To the Director, Rothamsted Experimental Station, Harpenden, Herts.).

Rothamsted Experimental Station.—The Right Hon. Lord Bledisloe, K.B.E., has been appointed Chairman of the Lawes Agricultural Trust Committee, Rothamsted Experimental Station, Harpenden, in the place of Sir John Thorold, Bart., who has resigned.

Closing of the Experimental Fruit Farm at Woburn.—The Woburn Fruit Farm, which was carried on from 1894 to 1918 by the Duke of Bedford, and subsequently with the aid of a grant from the Development Fund, administered by the Committee of the Rothamsted Experimental Station, is to be closed at Christmas, owing to the continued ill health of Mr. Spencer U. Pickering, F.R.S., rendering him unable to continue his experimental work on the Farm.

The Ormskirk Potato Trials, 1919: Erratum.—In last month's issue of this *Journal*, page 697, it was inadvertently stated that the Annual Report for 1919 of the Trials of Potatoes Immune from Wart Disease was obtainable from H.M. Stationery Office. This is incorrect. Applications for copies should be addressed to the Offices of the Ministry, 3, St. James's Square, London, S.W.1.

A description of this publication appears on page xvii of this issue.

Foot-and-Mouth Disease. — *Kent* (*Faversham District*). — On 26th October, just as the Ministry was about to withdraw all restrictions imposed on the movement of animals in connection with the outbreak of Foot-and-Mouth Disease at Baddlesmere, near Faversham, two further outbreaks occurred in the neighbourhood of Faversham, namely, one at Oare and one at Stone. As a consequence, it was necessary to reimpose restrictions over the usual area of 15 miles' radius, it being considered unsafe to make any modification of the usual practice in this respect, owing to the fact that an animal from the infected premises had recently been exposed in Sittingbourne Market. A further outbreak occurred at Oare on 2nd November, but since that date there has not been any spread of the disease. On 9th November the restrictions were modified as regards the outer portions of the district distant more than 5 miles from the infected places, and were entirely withdrawn from those outer parts of the area as from 16th November. The prohibition of movement now remains in force only in respect of the area lying within a radius of 5 miles of the infected places.

Suffolk (*Woodbridge District*).—On 19th November, the existence of Foot-and-Mouth Disease was confirmed on two farms in the occupation of the same owner, situated within about a quarter of a mile of each other at Martlesham, Woodbridge. The usual Order was at once issued applying restrictions to an area in Suffolk within a radius of 15 miles of the infected premises. No information is yet available as to the origin of the outbreaks.

Rabies.—*Wiltshire and Dorset.*—On 29th October an outbreak of Rabies was confirmed in a dog located at Shillingstone, near Blandford, Dorset. The premises were just outside the district originally scheduled on account of the outbreaks in Wiltshire, and it was therefore necessary to extend the area so as to include the district within a radius of 15 miles of Shillingstone not already within the controlled districts. On 16th November a further case occurred on premises near Fiddleford, near Sturminster, Newton, Dorset, about 4 miles from Shillingstone, and another on 19th November at Bishopstone, Salisbury. Thirteen outbreaks of Rabies have now been confirmed in this district since the original case on 14th August. In view of the improved position as regards the Wiltshire portion of the area, it was possible to contract the inner controlled area so as to comprise only the district lying within 5 miles of Wilton and Salisbury in which the majority of the cases in Wiltshire have been confirmed.

Glamorgan.—No further outbreak has occurred in this district, and in view of the fact that the disease has not spread from the kennels of the Glamorgan Hunt, in which it was originally confirmed on 11th September, the Ministry on 13th November contracted the scheduled district so as to comprise only the country lying within about 8 miles of Cowbridge.

Berkshire.—Only one further outbreak has been confirmed in Berkshire, namely, on 19th October, on premises at Caversham, in the Borough of Reading.

BREEDERS' ANNOUNCEMENTS.

HORSES.

SHIRES.

JACKSON, J. C., ASKERN.—Breeder of Shires. Stallions: Severn Secundus 36070 by Babingley Nulli Secundus; Tanbridge Tip-Top 28851 by King of Tunbridge 24351; Champion's Comrade 31298 by Childwick Champion 22215. Thirty other Stallions and Colts by fashionable sires kept for sale or hire. Fillies for sale.—Apply, FAULKNER, Smallages, Sykehouse, Snaith, Yorks. Telegrams: Smallages, Stainforth, Doncaster. Stations: Askern, Moss, and Stainforth.

CLYDESDALES.

GRAHAM, ROBERT, KAIMFLAT FARM, KELSO.—Breeder and owner of high-class Clydesdale Stallions, Colts and Fillies; most fashionable blood; large selection. Commissions executed. Station: Kelso.

CATTLE.

ABERDEEN—ANGUS.

MACAINSH, JOHN, Congash, Grantown-on-Spey, N.B.—Pure-bred Aberdeen-Angus Cattle.—Particulars on application.

DEVONS.

STANTON, HARWICH.—REGISTERED HERD RED DEVON DAIRY CATTLE. Devons are the best English Dairy Cattle under all conditions and in any climate.

FRIESIANS.

E. R. DEBENHAM, BLADEN DAIRY FARMS, BRIANTSPUDDLE, DORCHESTER. Pure imported and imported bred bulls (sound tuberculin test). Services to approved females. Apply the Manager.

GILSTON PARK HERD OF PEDIGREE BRITISH FRIESIANS, property of A. S. Bowlby, Esq. Bulls and Bull Calves generally for sale by Imported and other leading sires. Apply H. SCHOFIELD, Gilston Park Estate Office, Harlow, Essex.

JERSEYS.

JEROME, MRS., BILTON HALL, TOCKWITH, YORKS. Pedigree Jerseys. Heifers and young Bulls for Sale.

SHORTHORNS.

E. R. DEBENHAM, BLADEN DAIRY FARMS, BRIANTSPUDDLE, DORCHESTER. Herd typical dual purpose Shorthorns. Bull Thornby Duke (sound tuberculin test), sire Drusus with 15,791 lbs. milk in pedigree. Services to approved females. Apply to the Manager.

WELBECK HERD OF PEDIGREE SHORTHORNS, the property of the Duke of PORTLAND, K.G. Young Bulls and Heifers for sale, from the best strains.—Apply, ALEX. GALBRAITH, Norton, Cuckney, Mansfield.

DAIRY SHORTHORNS.

HOBBS R. W., & SONS, Kelmscott, Lechlade.—500 Dairy Shorthorns: milk records kept; many firsts Royal and London Dairy Shows. Pedigree Bulls and Bull Calves. 4-cross Bull Calves at moderate prices, suitable for non-pedigree dairy herds.

PLAYFORD HERD OF PEDIGREE DAIRY SHORTHORNS. Deep-Milking Strains of robust constitution. Bulls in service: Thornby Don (133918). Hermit II. (120697). Milk records kept, inspected by Dairy Shorthorn Association and Ministry of Agriculture Recorder. Young Bulls and Bull Calves for sale. Also Breeder of Pedigree Suffolk Sheep and Large Black Pigs.—S. R. SHERWOOD, Playford, Ipswich.

CATTLE—*continued.*

LINCOLN RED SHORTHORNS.

THE STAPLEFORD PARK HERD. A few young Bulls from Royal Prize Winners always for sale from carefully tested milking strains only. Apply C. S. Harvey, Wymondham, Oakham.

KERRY AND DEXTERS.

BRAISHFIELD MANOR HERD of Dexter Castle. Prizes won in 1915 include Championship R.A.S.E., Nottingham, first London Dairy Show.—Apply, Mr. W. A. OWEN, Elm Grove, Braishfield, Romsey.

PALMER, R. E. Pure Pedigree Kerry Cattle, Oaklands Park, Newdigate, Surrey.

HEREFORDS.

WHITE, W. J. S., ZEALS, WILTS.—Old-established Herd of Milking Herefords, Bulls and Calves, for Sale.

SOUTH DEVON.

GREENSLADE, W. R. J., 3, HAMMET STREET, TAUNTON, AND WELLINGTON, SOMERSET.—Sales of Devon Cattle, Dorset Horn Sheep, &c.

SHEEP.

OXFORD DOWN.

AKERS & CO., BLACK BOURTON, OXON.—Registered Oxford Downs, Rams and Ewe Lambs on Sale; inspection invited.

LINCOLN LONGWOOL.

HOYLES, GEO., SKIDBY MANOR, near HULL.—Pure Lincoln Longwool Sheep; true type, sound conditions, lustrous long wool, give satisfaction at home and abroad.

PIGS.

BERKSHIRE.

BRAISHFIELD MANOR HERD OF BERKSHIRE PIGS. Boars in use: Little John, Champion R.A.S.E., 1915, etc.; also Hugo, whose stock sold so well at Mr. Hiscock's Sale. Young stock of the best blood always for Sale.—Apply Mr. W. A. OWEN, Elm Grove, Braishfield, Romsey.

LARGE WHITE.

CHIVERS & SONS, LTD., HISTON, CAMBS.—Pedigree Large White Pigs, fine quality, good type, best strains. Young Stock for Sale.

COLSTON & BORROWFIELD HERDS OF LARGE WHITE PIGS, the property of R. Millington Knowles, Esq., The Hall, Colston Bassett, Notts.—Numbers and quality equal to pre-war standard.—Particulars from AGENT, Estate Office, Colston Bassett, Notts.

DENNY, E. H. M., STAPLEFIELD PLACE, STAPLEFIELD, SUSSEX.—Large White Yorkshire Pedigree Pigs. Station: Haywards Heath. Telegrams: Handcross.

GREENALL, SIR GILBERT, BART., C.V.O., WALTON HALL, WARRINGTON. The Walton and Worsley Herd of Pedigree Large White Pigs. Selections of all ages for sale at moderate prices. Apply to RICHMOND DAYBELL, Manager, Rowswood Farm, Higher-Walton, near Warrington. Station: Warrington. Telegrams: Daybell, Higher Walton, Warrington.

THE WARREN HERD OF PEDIGREE LARGE WHITE PIGS, the property of H. T. Williams, Esq.—Young Stock of the best strains for Sale, including a fine selection of in-pig Gilts.—Apply to RAYMOND KEER, Warren Home Farm, Broughton, Chester.

MIDDLE WHITE.

CHIVERS, JOHN, HISTON, CAMBS.—Pedigree Middle White Herd, containing best possible strains, including Royal champions. Young Stock for Sale.

EDGE, S. F., GALLOPS HOMESTEAD, DITCHLING, SUSSEX.—Albany Herd of Pedigree Middle Whites. Bred on open air system. Wonderful doers and breeders. Will thrive anywhere.

JEROME, MRS., BILTON HALL, YORK.—Pedigree Middle White Pigs, prize-winners. Boars and Gilts for Sale.

PIGS—*continued.*

MIDDLE WHITE—*continued.*

STAPLEFORD HERD OF MIDDLE WHITE PIGS. A few choice gilts and boars always for sale at reasonable prices. C. S. HARVEY, Wymondham, Oakham.

WEELEY HERD OF MIDDLE WHITES, bred on the open-air system, exclusively from Champion strains. Two 1919 Royal Show winners, and the sire and dam of a 1919 Cattle Show winner were bred in this herd. Apply to OSCAR GRAY, Tendring Farms, Limited, Weeley, S.O., Essex.

WEELEY HERD OF MIDDLE WHITES, founded on the finest prize winning strains, bred and reared in the open and folded on arable forage crops in exposed situation on East Coast. Quality unexcelled. Constitution unequalled. Young gilts and boars always on sale at commercial prices. Apply to OSCAR GRAY, Tendring Farms, Limited, Weeley, S.O., Essex.

LARGE BLACK.

PICKWELL HERD, Pedigree Large Blacks. Young stock from best strains at reasonable prices.—CAPTAIN CLAUDE W. HEMP, Stainbridge Farm, Bolney, Sussex.

LUDLOW HERD OF LARGE BLACK and ASHFORD HERD OF MIDDLE WHITE PIGS.—Pedigree Boars and Gilts for sale; bred on open-air system from unrelated stock; eligible for Herdbooks.—Apply MANAGER, Woodlands Pig Farm, Ludlow, Shropshire.

NEWHOUSE HERD of Pedigree Large Black Pigs. Boars and Gilts from best strains.—ROBERT FORTUNE, Newhouse, Cranleigh, Surrey.

DUNSTALL HERD of Pedigree Large Blacks, bred from prize strains under natural conditions. Prolific, hardy, grand doers and of choice type. Young Boars and Gilts. Prices Moderate.—LIONEL E. HORNE, Moreton-in-Marsh, Glos.

WILLIAMS, ELLIS R., GLASFRYN, CHWILOG, NORTH WALES.—Helyg Large Blacks, bred for hardiness and thrift. Best acclimatised stock for Welsh and Border Counties breeders. Prices moderate.

LINCOLNSHIRE CURLY-COATED.

CHARNWOOD HERD.—A grand lot of young Boars ready for service, all descended from Royal winners. Inspection invited.—G. SIMPSON, Charnwood, Lowdham, Notts.

GLOUCESTER OLD SPOT.

THE FAIRFIELD HERD OF GLOUCESTER OLD SPOT PIGS for Sale. 100 to choose from, including winners at Hereford and Worcester Show. Gilts, Boars and Sows with litters; also, owing to change of blood, several Boars by Berkeley Foreman.—J. B. DOWDING, Fairfield, Leominster.

POULTRY.

MAJOR, ARTHUR C.—Breeder and Exhibitor thirty years. Champion Duck and Silver Grey Dorkings, "England's best fowl." Prizes at all Shows, and exported all over the world. Prices moderate. Eggs, 1s. each.—ARTHUR C. MAJOR, Ditton, Langley, Bucks.

CONTINENTAL POULTRY EXPORTERS, STRATFORD, ESSEX.—Pullets, 30 Breeds, from 10/6 each. List free.

AUCTIONEERS, LIVE STOCK, ETC., AGENTS.

WATERS & RAWLENCE, SALISBURY.

MISCELLANEOUS ADVERTISEMENTS—(*Cheap Prepaid*).

For Cleft Chestnut Unclimable Fencing, apply to THE STANLEY UNDERWOOD COMPANY, LIMITED, Shottermill, Haslemere, Surrey.

64 Page Book about Herbs and How to Use Them, 2d.—TRIMNELL, THE HERBALIST, RICHMOND ROAD, CARDIFF.

Rippins Easy to Keep Account Books for Farmers. Herd Books for Cows and Pigs. Stud Books for Mares. Gripall Cash Book dissects income and costs **of the farm** from all sources. Furro Crop Account Book. Service Certificate Books for Stallions, Boars, Bulls. Milk Record Books and Pads. Poultry Account Books. Egg Laying Record Cards. Specimen rulings free. RIPPIN & BAKER, The Newarkes, Leicester.

All applications for Advertisements in "The Journal of the Ministry of Agriculture" should be addressed to C. VERNON & SONS, LTD., 38, Holborn Viaduct, London, E.C. 1.

HOW I MAKE BIG MONEY
OUT OF
UNMANAGEABLE HORSES.

By J. A. BUTLER.

ABOUT two years ago, when I was in America, I witnessed up in New York State an exhibition of horse-training that opened my eyes. A man by the name of Mackley took a devil of a mean, vicious mare that hadn't been harnessed for seven months, and in a few days had her gentle enough for a schoolgirl to drive. Mackley had taken the mare off the owner's hands for £10, and just ten days after sold her for £35. A clear profit of £25 in ten days!

That started me investigating. I learned that Mackley had simply used the methods introduced by the famous horse-trainer, Jesse Beery. Beery, I learned, used to go about the country giving wonderful exhibitions in colt-breaking and horse-training; but realising that he could accomplish more by teaching his methods by post, had given up his exhibition work to spread his horse-training secrets by postal instruction. Mackley had studied Beery's Course in his spare time, and in a few months was able to accomplish magical results with unbroken colts and horses with bad habits.

OTHER SUCCESSES.

Mackley's work showed me a way to make some easy money, and I determined to take Prof. Beery's Course in horse-training—but before doing so I made further inquiries. Here are what a few of Beery's students said. I'll let them tell of their success in their own words.

Mr. S. L. Arrant writes:—Just to test Beery's methods I bought the worst balky, kicking, fighting horse I could find. Paid £13 for him. After handling him only a few hours according to Beery's system I sold him for £27.

Mr. Dell Nicholson, Portland, writes:—I have trained a four-year-old mare that was given up by everybody. Bought her for £7, and now have her so gentle, my little boy handles her. Wouldn't take £40 for her.

Dean L. Smith, Findley, writes:—By following Beery's instructions have changed a worthless, dangerous balker into a horse worth £45.

Everett McBlock writes:—Have just broken a pony to drive and taught it some tricks. Owner bought it for £3 10*s*. Paid me £8 to train it. He just sold it to a show company for £30.

HOW I WORK.

The big source of my income is in buying up unmanageable colts and horses at bargain prices, and, after training the animals, selling them at a good profit. However, I also pick up good money handling colts and training horses for others on a fee basis. For instance, a farmer had a beautiful driving bay that had the bad habit of shying.. A piece of paper blowing across the road would set the horse crazy. The owner thought a great deal of the animal, but couldn't take chances on the shying habit. A friend of his for whom I had done some work put this man in touch with me, and in a few hours I had the horse completely cured of the habit—for which job I received £10.

CURING BAD HABITS.

You can see from this that my work consists not only in breaking colts and "gentling" vicious horses, but in curing the various bad habits a horse can have—such as shying, balking, fear of motor cars, etc., pulling at hitching strap, pawing in the stall, etc., etc.—Beery's method of colt breaking are particularly amazing. Under the old way of handling raw colts one usually had to half kill the horse as well as himself to accomplish anything—and then the colt was usually spoiled or hurt in some way or another. But when you apply Beery's principles there is no hard, long work or injury to the colt.

No one should have a biting, kicking, or balky horse when it is so easy to cure these vicious habits. No one should attempt to break in a colt the old-fashioned way when Beery's methods make the task so easy. To every horse-owner, to every lover of horseflesh, my advice is to get acquainted with the Beery principles. You can not only make money for yourself, but you can do a world of good, particularly at this day when war-demands have placed a premium on horses.

WONDERFUL BOOK FREE.

I have been requested to state that Prof. Jesse Beery will send his remarkable booklet, "How to Break and Train Horses," free to those interested. It is a booklet well worth having, as it reveals some startling information on horse-training. I have heard men who considered themselves expert horsemen say that the booklet was a revelation to them. There is no use in my going into details on the booklet when you can get it free for the asking.

Just drop a line to Prof. Jesse Beery, Dept. 14211, Pleasant Hill, Ohio, U.S.A., and the booklet will be sent free by return of post. A postcard (1*d*. stamp) will do as well as a letter.